



Venice Chapter



IoT: utile di sicuro. Ma sicuro?

Linux Day 2018 - Bolzano

Igor Falcomatà – ifalcomata@enforcer.it



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\$ whoami

- attività professionale:
 - analisi delle vulnerabilità e penetration testing
 - security consulting
 - formazione
- altro:
 - ISACA Venice
 - sikurezza.org
 - (f|er-|bz-)lug

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Agenda

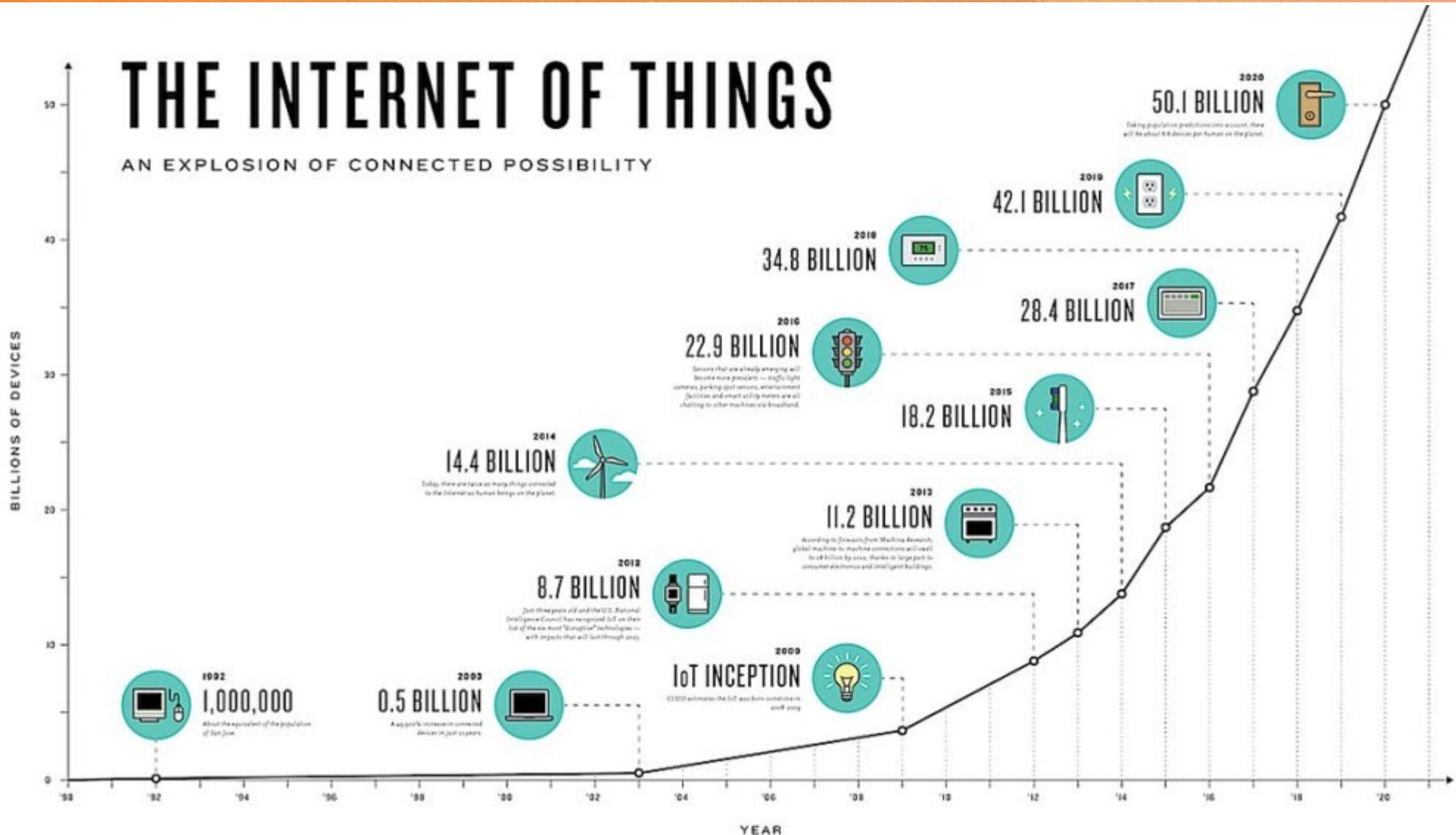
- **Introduzione a IoT**
- **IoT, IoE, IoM, M2M, IoS, CCS, ..**
- **Utilizzi e utilizzatori**
- **IoT e sicurezza**
- **Come fare?**
- **Riferimenti**
- **Q&A**

Introduzione a IoT

The **Internet of Things (IoT)** is the network of physical devices, vehicles, home appliances and other items embedded with **electronics, software, sensors, actuators, and connectivity** which enables these objects to connect and exchange **data**.^{[1][2][3]} Each thing is uniquely identifiable through its embedded **computing system** but is able to inter-operate within the existing **Internet** infrastructure.

https://en.wikipedia.org/wiki/Internet_of_things

Crescita esponenziale..



<https://hackernoon.com/internet-of-everything-the-iot-market-is-projected-to-expand-12x-from-2017-2023-175f845c2bcf>

Dispositivi..

Home & Building Automation

- Bringing intelligence, convenience and lifestyle



Smart Energy

- Adding power awareness to products and helping to save energy



Multimedia

- Wireless audio streaming and advanced remote controls



Security and Safety

- Improving remote control and home monitoring



Industrial M2M Communication

- Internet enhanced M2M communication using existing Wi-Fi infrastructure



https://theiotlearninginitiative.gitbooks.io/amazonwebservicesiot/content/iot_devices.html

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- IoT e sicurezza
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IoT, IoE, IoM, M2M, IoS, CCS, ..

Internet of Things

IoT, IoE, IoM, M2M, IoS, CCS, ..

Internet of Everything

IoT, IoE, IoM, M2M, IoS, CCS, ..

Internet of Machines

IoT, IoE, IoM, M2M, IoS, CCS, ..

Machine to Machine

IoT, IoE, IoM, M2M, IoS, CCS, ..

Internet of S..

IoT, IoE, IoM, M2M, IoS, CCS, ..

**Servers?
Security?
Skynet?**

IoT, IoE, IoM, M2M, IoT, CCS, ..

Screenshot of a Twitter profile for "Internet of Shit (@internetofshit_it)" showing a bio about putting a chip in it to say hello, stats (4,316 tweets, 157 following, 265K followers, 3,293 likes), and a tweet from Casey Newton about AI laughing at us.

Internet of Shit (@internetofshit_it)
whatever, put a chip in it. say hello:
internetofshit@gmail.com

In your stuff
facebook.com/internetofshit
Joined July 2015
1,051 Photos and videos

Tweets 4,316 Following 157 Followers 265K Likes 3,293 Moments 2

Tweets **Tweets & replies** **Media**

t Internet of Shit Retweeted
Casey Newton @CaseyNewton · Mar 7
I would never have guessed that a short-term problem with AI would be 'how do we get it to stop laughing at us'
18 389 1.0K
[Show this thread](#)

Internet of Shit @internetofshit_it · Mar 7
You had literally one job: not make your home assistant laugh like an evil maniac

Techmeme @Techmeme
Amazon confirms some Alexa devices are randomly laughing and says it's working on a fix, after multiple users posted about it on social media (@shannon_liao / The Verge)

New to Twitter?
Sign up now to get your own personalized timeline!

Sign up

You may also like · Refresh

SwiftOnSecurity @SwiftOnSecurity

briankrebs @briankrebs

Spectre Server @sadserver

IoT, IoE, IoM, M2M, IoT, CCS, ..

Internet of Sh*t (@internetofshit) | Twitter - Mozilla Firefox

Internet of Sh*t (@int... Twitter, Inc. (US) https://twitter.com/internetofshit

Home About Search Twitter Have an account? Log in

Tweets 4,316 Following 157 Followers 265K Likes 3,293 Moments 2 Follow

Internet of Sh*t @internetofshit

whatever, put a chip in it. say hello:
internetofshit@gmail.com

In your stuff
facebook.com/internetofshit
Joined July 2015
1,051 Photos and videos

Tweets Tweets & replies Media

Sh*t

Techmeme @Techmeme Amazon confirms some Alexa devices are randomly laughing and says it's working on a fix, after multiple users posted about it on social media (@shannon_liao / The Verge)

New to Twitter?
Sign up

You may also like · Refresh

SwiftOnSecurity @SwiftOnSecurity
briankrebs @briankrebs
Spectre Server @sadserver

IoT, IoE, IoM, M2M, IoS, CCS, ..

Internet of things - Wikipedia - Mozilla Firefox

Internet of things - W... +

https://en.wikipedia.org/wiki/Internet_of_things#Confusing_terminology

133% | C Search

Confusing terminology [edit]

Kevin Lonergan at Information Age, a business-technology magazine, has referred to the terms surrounding IoT as a "terminology zoo".^[196] The lack of clear terminology is not "useful from a practical point of view" and a "source of confusion for the end user".^[196] A company operating in the IoT space could be working in anything related to sensor technology, networking, embedded systems, or analytics.^[196] According to Lonergan, the term IoT was coined before smart phones, tablets, and devices as we know them today existed, and there is a long list of terms with varying degrees of overlap and technological convergence: Internet of things, Internet of everything (IoE), industrial Internet, pervasive computing, pervasive sensing, ubiquitous computing, cyber-physical systems (CPS), wireless sensor networks (WSN), smart objects, cooperating objects, machine to machine (M2M), ambient intelligence (Aml), Operational technology (OT), and information technology (IT).^[196] Regarding IIoT, an industrial sub-field of IoT, the Industrial Internet Consortium's Vocabulary Task Group has created a "common and reusable vocabulary of terms"^[197] to ensure "consistent terminology"^{[197][198]} across publications issued by the Industrial Internet Consortium. IoT One has created an IoT Terms Database including a New Term Alert^[199] to be notified when a new term is published. As of March 2017, this database aggregates 711 IoT-related terms,^[200] however, without any attempts to reduce terminological ambiguity and complexity.^[citation needed]

IoT adoption barriers [edit]

IoT, IoE, IoM, M2M, IoS, CCS, ..

Internet of things - Wikipedia - Mozilla Firefox

W Internet of things - W... +

https://en.wikipedia.org/wiki/Internet_of_things#Confusing_terminology

133% | C | Search | Cosa cavolo Significano?

Confusing terminology [edit]

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IoT adoption barriers [edit]

IoT: Dispositivi, computer, software

Oggetti e' il termine giusto.

Il vostro telefonino, il tablet, il computer, l'automobile, il televisore, la lavatrice ed il ferro da stiro non sono **dispositivi**, sono **oggetti di uso comune**, dei quali conosciamo la funzione, di cui siamo proprietari, che hanno spesso un'unica funzionalita' e che usiamo quando opportuno per fare quello che desideriamo.

La soprastante affermazione e' divenuta **totalmente e tragicamente errata**; questa chiacchierata spera di fornirvene in maniera intuitiva la percezione; questa forse vi permetterà una meno pericolosa navigazione nell'infido oceano dell'**Internet delle Cose**.

(credits)

e-privacy XXI — Parole (ostili) contro la Rete - Mozilla Firefox

e-privacy XXI — Parole (... x +

e-privacy.winstonsmith.info/e-privacy-XXI.html

Search

Email address

Donazione:

10

EUR

bitcoin

Ora	Relatore	Titolo
14:30	Apertura lavori pomeridiani	
14:30	 Pasquale Annicchino (Lex Digital)	<i>La sorveglianza delle minoranze religiose nell'era del terrorismo globale</i>
14:55	 Giovambattista Vieri	<i>Il gioco nell'occhio</i>
15:20	 Stefano Vignera (Bislab)	<i>Industria 4.0, libertà del lavoratore e controllo della prestazione lavorativa</i>
15:45	 Fabio Carletti	<i>Cyberbullismo giovani e adulti in pericolo</i>
16:10	  Diego Giorio (SEPEL Editrice)	<i>Panem et circenses l'ha detto Zuckerberg?</i>
16:35	  Marco Calamari e Igor Falcomata'	<i>Internet of Thing: istruzioni per l'uso</i>
17:00	Introduce e modera: Marco Calamari Partecipano:  Massimo Bozza , Fabio Carletti , Igor Falcomata' , Andrea Palumbo	<i>Tavola Rotonda: Quali diritti con la IOT</i>
18:00	Chiusura lavori	

Sabato 24 Giugno 2017 mattina

<http://e-privacy.winstonsmith.info/e-privacy-XXI.html>

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Utilizzi di IoT

The screenshot shows a Mozilla Firefox browser window with the title "Google - Mozilla Firefox". The address bar displays the URL "https://www.google.it/?gfe_rd=cr&dcr=0&ei=b6ypWpGhMsTw8Af-ro-ADw". The main content area shows the Google homepage with the "Google" logo. A search bar at the top contains the text "internet of". Below the search bar, a list of suggested search terms is displayed, all starting with "internet of" followed by a specific topic. The topics listed are: things, pdf, esempi, people, arduino, uniud, energy, services, tesi, and money. At the bottom of the search results, there are two buttons: "Cerca con Google" and "Mi sento fortunato". The status bar at the bottom of the browser window shows the text "Italia".

Utilizzi di IoT

internet of things - Cerca con Google - Mozilla Firefox

internet of things - C... +

https://www.google.it/search?dcr=0&source=hp&ei=b6ypWtGBOcWxsAGD2ovwDg&q=interr 120% C Search

Accedi

Google

internet of things

Tutti Immagini Notizie Video Libri Altro Impostazioni Strumenti

Circa 37.900.000 risultati (0,57 secondi)



Articoli accademici per **internet of things**

Internet of things - Xia - Citato da 396

Internet of things - Kopetz - Citato da 239

Internet of things - Wortmann - Citato da 139



Altre immagini

Internet delle cose

In telecomunicazioni **Internet** delle cose (o, più propriamente, **Internet** degli oggetti o **IoT**, acronimo dell'inglese **Internet of things**) è un neologismo riferito all'estensione di **Internet** al



In telecomunicazioni Internet delle cose è un neologismo riferito all'estensione di Internet al mondo

Utilizzatori di IoT

- **Nessun utilizzo**
- **Utente / consumer (privato)**
- **Utente / consumer (business)**
- **Rivenditore / integratore**
- **Sviluppatore / vendor**

E il vostro rapporto con IoT?

Nessun utilizzo?!

- ~~Nessun utilizzo~~
- utilizzo passivo e/o inconsapevole

IoT è nella vostra automobile, nel vostro telefono, nella vostra TV, nel vostro router, nel vostro impianto d'allarme, nel vostro contatore, nel semaforo sotto casa, ...

Altri utilizzi?

- **vittima?!**

**“internettizzazione” e
miniaturizzazione degli apparati di
tracciamento, spionaggio, law
enforcement, remote access, ..**

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The **S** in IoT
stands for **Security**

Internet of Threats?

Internet of Things? More Like the Internet of Attack Vectors - Mozilla Firefox

File Edit View History Bookmarks Tools Help

www.infosecisland.com/blogview/23178-Internet-of-Things-More-Like-the-Internet-of-Attack-Vect Google

Front Page | Blog Posts | Resources | Media | Whitepapers | VISIT SECURITYWEEK.COM

Internet of Things? More Like the Internet of Attack Vectors

Wednesday, May 29, 2013

Contributed By:
Allan Pratt, MBA



Everyone is excited about the “Internet of Things,” also known as, IoT. Imagine, cars able to talk to other cars, devices able to contact repair facilities when repairs are needed, cars able to connect to the traffic grid, and refrigerators able to alert you when your milk or orange juice is running low.

According to Dr. Stefen Ferber of Bosch Software (@Stefferber on Twitter), “The Internet of Things is a place where technology and business meet, leading to the creation of new disruptive business models.”

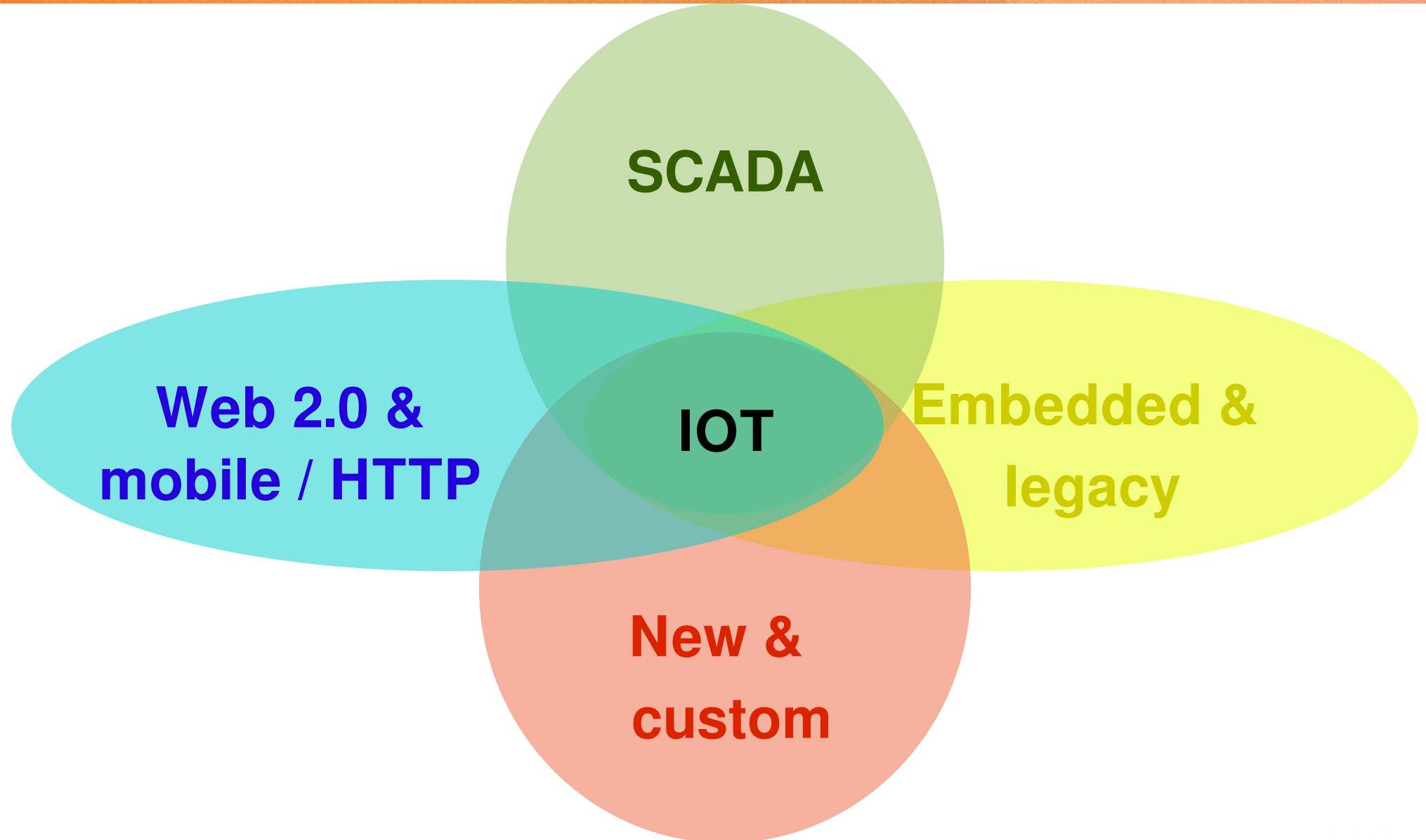
But here’s how I see the situation. Cars may become mobile data-gathering devices. When an unsuspecting driver passes by, the attacker can grab your personal information including your name, address, vehicle identification number (VIN), and any other pertinent automotive information they can get away with in order to steal your identity.

Consider this scenario: a fast driver could have his or her vehicle connect with the traffic grid, so that whenever his or her car approaches an intersection, the light immediately turns green.

Since your home and devices will be able to communicate, an unscrupulous repair person could discover your home

<http://www.infosecisland.com/blogview/23178-Internet-of-Things-More-Like-the-Internet-of-Attack-Vectors.html>

Tecnologia



SCADA?!

ma non sono quei grossi “così” che si usano negli impianti industriali? Che c’entrano con IoT?

Ci sono ovviamente differenze tra SCADA, IIOT, IOT, .. ma anche molte analogie.

1. Complessità (vs TTM)

Quanto software ?

- Nel 1969 siamo andati sulla Luna con meno di 10.000 linee di software, e per lo Shuttle negli anni '90 ne sono bastate 400.000.
- Un pacemaker ci salva la vita con 100.000 linee, tante quante ne aveva Photoshop 1.0 che oggi è cresciuto a 3.500.000.
- Nel 1971 la prima versione di Unix aveva 10.000 linee, mentre Debian 5.0 (Lenny) nel 2009 ne aveva 65.000.000 (incluse le applicazioni disponibili).
- Nel 1991 Windows 3.1 contava 2.000.000 di linee, nel 2001 Windows XP 43.000.000
- Un "vecchio" caccia supersonico F22 "Raptor" si contentava di 2.000.000, mentre un aereo da trasporto Boeing 787 ne vuole 9.000.000 ed il famigerato F35 45.000.000

1. Complessità (vs TTM)



Fiat 500.

Dal 1960 ad ora: da zero a 50.000.000 di linee

1. Complessità (vs TTM)

- K o M linee di codice
- oggetti “poco costosi” / ciclo di vita
- Time to Market / startup / outsourcing
- spesso in C (memory mangling, ..)

che cosa mai potrà
andare storto?

1. Complessità (vs TTM)

Quindi il problema e' "troppo software"?

No, il problema e' anche che il software degli oggetti IoT ~~fa schifo~~ e' di cattiva qualita', e viene prodotto in questo modo non per cattiveria, ma a causa del modello di business degli oggetti IoT.

Gli oggetti contenenti software non lo rivelano direttamente, e quindi il software di per se non e' un "valore"; rimpiazzarli con un nuovo modello e' sempre il desiderio primario di ogni produttore.

Pensate ancora che il software contenuto nel tipico oggetto IoT (ma anche nel vostro router ADSL) sia accuratamente sviluppato ed amorevolmente testato?

Pensate davvero che per il vostro braccialetto fitness, la vostra telecamera sorvegliabambini od il Furby incautamente regalato a vostro figlio usciranno le patch?

Pensate infine che i vostri oggetti IoT ed il vostro impianto di domotica non finiranno listati su Shodan?

2. Hardware / OS (micro)

- No memory protection (flat MM)
- No DEP/NX/XN/..
- No CPU mode / Protection ring
- spesso in C (memory mangling, ..)

che cosa mai potrà
andare storto?

2. Hardware / OS (embedded)

- **Tecnologie anti-exploiting carenti o assenti**
- **Tecniche attacco “comuni”**
- **Protezione carente/assente comunicazioni di rete**
- **Interfacce/API web based**

che cosa mai ..

Tecniche anti-exploiting?

Easy Feature Comparison | HardenedBSD - Mozilla Firefox

Easy Feature Compar... x +

https://hardenedbsd.org/content/easy-feature-comparison

Search

Donation buttons: VISA, MasterCard, American Express, Discover

2018 Sprint 1 Donation Status: We've raised \$1437.00 out of \$10,500 USD.

Navigation: Home, About HardenedBSD, Stable Builds, Packages

Feature	HardenedBSD	FreeBSD	OpenBSD	NetBSD
Address Space Layout Randomization (ASLR)	<input checked="" type="checkbox"/>	<input type="checkbox"/> *	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Base compiled as Position-Independent Executables (PIEs)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Base compiled with RELRO + BIND_NOW	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/> *
BTC: 1FmbSRvZK4yC1b6aj eZWSvYXV2nmvwdWQq	Ports tree compiled with PIE, RELRO, and BIND_NOW	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
BCH: 1PbGHPmNdNqSmh4L 3SbvPdaPzSL9kZ5H6f	Static PIE	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
ETH: 0x9Ea8E44736AC8Ed 806ef57f7F174a14D93689775	ASLR brute force protection (SEGVGUARD)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> *
	Prevention of the creation of writable and executable memory mappings (W^X part one)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
	Restrictions on mprotect to prevent switching pages between writable and executable (W^X part two)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/> *
	sysctl hardening	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2018 Sprint 1 Donation Status	Network stack hardening (IP ID randomization, use IPv6 temporary addresses)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
	Executable file integrity enforcement	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> *
	Boot hardening	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	procfs/linprocfs hardening	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/> *
	LibreSSL in base as the default cryptography library	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
	SROP mitigation	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
	Most of base sandboxed	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
	Trusted Path Execution	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

<https://hardenedbsd.org/content/easy-feature-comparison>

IOT: utile di sicuro. Ma sicuro? - Linux Day 2018 – Bolzano - 27/10/2018

OS IoT più diffuso?

The screenshot shows a Mozilla Firefox browser window with the following details:

- Title Bar:** The kernel of the argument over Linux's vulnerabilities | The Washington Post - Mozilla Firefox
- Address Bar:** www.washingtonpost.com/sf/business/2015/11/05/net-of-insecurity-the-kernel-of-the-argument/?utm
- Header:** Sections ▾ The Washington Post Share ↗ Net of Insecurity ▾
- Content Area:** A large image of Linus Torvalds wearing glasses, looking slightly to the side. The image has a "NET OF INSECURITY" watermark.
- Text Overlay:** NET OF INSECURITY
THE KERNEL OF THE ARGUMENT
Fast, flexible and free, Linux is taking over the online world. But there is growing unease about security weaknesses.

<http://www.washingtonpost.com/sf/business/2015/11/05/net-of-insecurity-the-kernel-of-the-argument>

3. Aggiornamenti

**Internet of (billion of)
Things (to patch)**

3. Aggiornamenti

- **Dispositivi non aggiornabili**
- o solo “on-site”
- o solo “manualmente”
- aggiornamenti non rilasciati

Buon lavoro..

Case study: nabaztag

Համառոտ պատմություն: Կարելոր Փաստեր - 4



2005: Nasce Nabaztag

e' la traslitterazione dall'armeno "Նապաստակ" di "coniglio"; creato da Rafi Haladjian e Olivier Mével.

Prodotto complessivamente in oltre 100.000 esemplari dalla compagnia francese **Violet**, poi fallita ed incorporata da **Mandscape**, poi chiusa ed i cui asset sono stati acquistati da **Aldebaran Robotics** e dimenticati.

Il mio coniglio e' l'unica cosa informatica che in 30 anni di convivenza mi abbia fatto fare bella figura e guadagnare punti con la mia compagna.

Motto: "*if you can even connect rabbits, then you can connect anything*" (credit: @inakivazquez)

Case study: nabaztag

Breve storia: fatti importanti – 4



Ha un pulsante sulla testa, due orecchie mosse da motorini passo-passo e con encoder per rilevarne la posizione, 4 LED multicolori, un lettore RFID, una scheda audio con microfono ed una scheda WiFi.

E' controllato da un server remoto su cui si possono caricare plugin ed azioni. Puo' muovere le orecchie e fare coreografie con i LED, leggervi oroscopi e quotazioni azionarie.

Si possono "Sposare" due conigli, in modo che se si muovono le orecchie ad uno, l'altro si mette a suonare e lampeggiare, e le muove nello stesso modo. Non banale spiegarlo ad un cliente in ufficio!

Case study: nabaztag

Nabaztag: network protocol

Nabaztag:tag (v2) + OpenJabNab

Due to lack of documentation, the network protocol was sniffed & partially reverse engineered.

All client/server communications use the XMPP Jabber protocol (TLS encrypted).

However, when blob need to be transferred, Base64 encoded objects are transferred using HTTP cleartext protocol.

Because the lack of client side computing power, when a text message need to be read by the rabbit, is sent to the server that rasterize it in a MP3 file, then transferred during the XMPP session using plain HTTP.

http://www.cassandracrossing.org/documents/sha2017_calamari_an_autopsy_in_iot_nabaztag_the_hare.pdf



Case study: nabaztag

Nabaztag: network protocol

Nabaztag:tag (v2) + OpenNabNal

TLS sì,

Due to lack of documentation, the network protocol was sniffed & partially reverse engineered.

**ma soggetto a MITM
(non verifica cert)**

All client/server communications use the XMPP Jabber protocol (TLS encrypted).



However, when blob need to be transferred, Base64 encoded objects are transferred using HTTP cleartext protocol.

Because the lack of client side computing power, when a text message need to be read on the device is sent to the server that rasterize it in a MP3 file, then transferred during the XMPP session using plain HTTP.

Case study: nabaztag

Nabaztag: simple attack - 2

Nabaztag:tag (v2) + OpenJabNab

The content of server rendered MP3 file was easily readable in the HTTP stream.



Using ARPspoof to poisoning again the router, Iptables to mount a local MITM, and BURPSniffer proxy, a setup was prepared to intercept the server -> client communication side, and to replace the HTTP object containing the rasterized MP3 with a different one.

That way, the bunny is served with a modified MP3 saying "*I'm possessed, to have me back pay a Bitcoin*"

The session was repeated, and the rabbit give a quite different "Hello" to his master.

Case study: nabaztag

- **Traffico (comandi) cifrato senza verifica dei certificati**
- **Traffico (contenuti) in chiaro**
- **Utilizzo di risorse in cloud (storage/cpu limitati)**
- **“Orfano” (prodotto abbandonato)**

Design del 2005..

..siamo nel 2018..

..siamo nel 2018

IoT Insecurity: Top Connected Device Security Concerns | Threatpost | The first stop for security news - Part 2 - Mozilla Firefox

IoT Insecurity: Top C... x +

https://threatpost.com/iot-insecurity-pinpointing-the-problems/119389/2/

Welcome > Blog Home > Hacks > IoT Insecurity: Pinpointing the Problems

IOT INSECURITY: PINPOINTING THE PROBLEMS

July 21, 2016 , 7:00 am

by Tom Spring

Internet Connected and Insecure

The IoT fridge threat is not theoretical. In fact, it was last year when researchers uncovered a flaw in Samsung's DC70HME1RSD smart fridges that attackers could exploit.

<https://threatpost.com/iot-insecurity-pinpointing-the-problems/119389/2/>

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AMD Investigating Reports of 13 Critical Vulnerabilities Found in Ryzen, EPYC Chips
March 13, 2018 , 4:04 pm

Lookout: Dark Caracal Points To APT Actors Moving To Mobile Targets
March 8, 2018 , 11:59 am

(o almeno nel 2016)

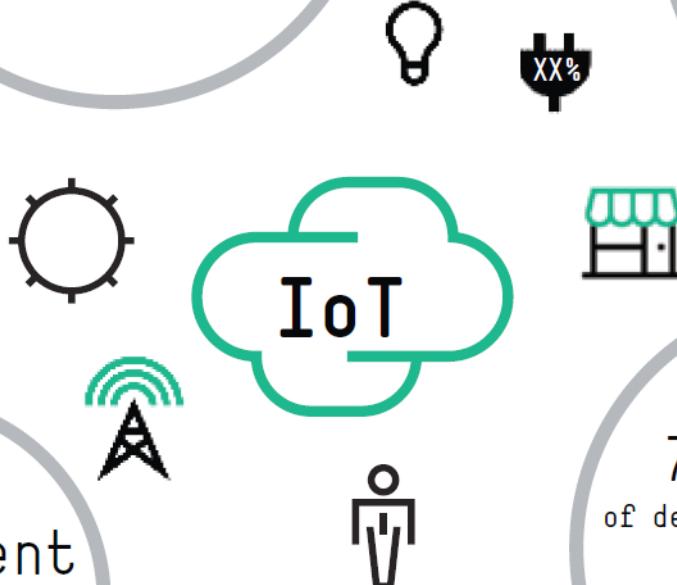
90 percent
of devices collected at least one piece of personal information via the device, the cloud, or its mobile application.

Six out of 10 devices that provide user interfaces were vulnerable to a range of issues such as persistent XSS and weak credentials.

80 percent
of devices along with their cloud and mobile application components failed to require passwords of a sufficient complexity and length.

70 percent
of devices used unencrypted network service.

70 percent
of devices along with their cloud and mobile application enable an attacker to identify valid user accounts through account enumeration.



Chiudete Internet..

INTERNET OF DILDOS: A LONG WAY TO A VIBRANT FUTURE - FROM IOT TO IOD - Mozilla Firefox

INTERNET OF DILDOS: A ... +

www.securitynewspaper.com/2018/02/03/internet-dildos-long-way-vibrant-future-iot-iod/ 120% C Search

Vibratissimo Panty Buster product, Image source: vibratissimo.com

VULNERABILITIES

The following vulnerabilities, describe issues in the iOS/Android application and the corresponding backend as well as hardware related issues.

1. Customer Database Credential Disclosure
2. Exposed administrative interfaces on the internet
3. Cleartext Storage of Passwords
4. Unauthenticated Bluetooth LE Connections
5. Insufficient Authentication Mechanism
6. Insecure Direct Object Reference
7. Missing Authentication in Remote Control
8. Reflected Cross-Site Scripting

1) CUSTOMER DATABASE CREDENTIAL DISCLOSURE

In the webroot of the host vibratissimo.com a .DS_STORE file was found. Those files are always a

<http://www.securitynewspaper.com/2018/02/03/internet-dildos-long-way-vibrant-future-iot-iod/>

Case study: IP Cam



VOGLIO PIANGERE

di GIULIANO MARRUCCI

REPORT

<http://www.report.rai.it/dl/Report/puntata/ContentItem-7907d06c-adcf-4f60-8edd-90aca383e535.html>

IOT: utile di sicuro. Ma sicuro? - Linux Day 2018 – Bolzano - 27/10/2018

Case study: IP Cam

```
root@kali: ~
File Edit View Search Terminal Help
root@kali:~# telnet 217.133. [REDACTED] 81
Trying 217.133. [REDACTED]...
Connected to 217.133. [REDACTED].
Escape character is '^]' .
GET login.cgi HTTP/1.0

HTTP/1.1 200 OK
Date: Tue May 9 21:54:56 2017
Server: GoAhead-Webs
Last-modified: Thu Jan 1 00:00:00 1970
Content-type: text/html
Cache-Control: no-cache
Content-length: 66
Connection: close

var loginuser="report";
[REDACTED]
var loginpass="rai3";

var pri=255;

Connection closed by foreign host.
root@kali:~#
```

Case study: IP Cam

Multiple vulnerabilities found in Wireless IP Camera (P2P) WIFICAM cameras and vulnerabilities in custom http server - IT Security Research by Pierre - Mozilla Firefox

Multiple vulnerabilities f... +

https://pierrekim.github.io/blog/2017-03-08-camera-goahead-0day.html

Search

IT Security Research by Pierre

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Multiple vulnerabilities found in Wireless IP Camera (P2P) WIFICAM cameras and vulnerabilities in custom http server

TL;DR: by analysing the security of a camera, I found a pre-auth RCE as root against 1250 camera models. Shodan lists 185 000 vulnerable cameras. The "Cloud" protocol establishes clear-text UDP tunnels (in order to bypass NAT and firewalls) between an attacker and cameras by using only the serial number of the targeted camera. Then, the attacker can automatically bruteforce the credentials of cameras.

Product Description

The Wireless IP Camera (P2P) WIFICAM is a Chinese web camera which allows to stream remotely.



<https://pierrekim.github.io/blog/2017-03-08-camera-goahead-0day.html>

Case study: IP Cam

- Decine di prodotti “diversi” (derivati dallo stesso firmware/produttore)
- UPnP
- Credenziali default (Mirai) [*]
- Auth bypass noto dal 2004
- Traffico cloud in chiaro
- No aggiornamenti (firmware) [**]



CENTRAL EUROPE

MIDDLE EAST

SCANDINAVIA

AFRICA

UK

ITALY

SPAIN

MORE ▾

NEWSLETTERS

ALL WRITERS



to the Internet while they enjoy a cheeky pint.

As the gallery of snapshots shows below, every facet of our lives can be recorded for the viewing of the Internet at large. (*Faces and identifiable markers have been blurred by ZDNet to protect identities*.)

The most shocking of Shodan



[SEE FULL GALLERY](#)

1 - 5 of 9

[NEXT >](#)

But why does this happen?

Shodan scours the Web for devices which use Real Time Streaming Protocol (RTSP port 554) which are left open without basic password protection -- or only the default password settings -- in place. Luckily for those with vulnerable webcams, Shodan trawls the web for open feeds but only takes a snapshot before moving on.

<http://www.zdnet.com/article/shodan-the-iot-search-engine-which-shows-us-sleeping-kids-and-how-we-throw-away-our-privacy/>

IOT: utile di sicuro. Ma sicuro? - Linux Day 2018 – Bolzano - 27/10/2018

OWASP IoT Attack Surface Areas

Ecosystem Access Control

Device Memory

Device Physical Interfaces

Device Web Interface

Device Firmware

Device Network Services

Administrative Interface

Local Data Storage

Cloud Web Interface

Ecosystem Communication

Vendor Backend APIs

Third-party Backend APIs

Update Mechanism

Mobile Application

Vendor Backend APIs

Network Traffic

Image credits: Dan Miesseler

<https://hackaday.com/2016/06/13/iot-security-is-an-empty-buzzword/>

Agenda

- Introduzione a IoT
- IoT, IoE, IoM, M2M, IoS, CCS, ..
- Utilizzi e utilizzatori
- IoT e sicurezza
- **Come fare?**
- Riferimenti
- Q&A

Come fare?

- Awareness: I stands for Internet
- Security by Design
- Privacy by Design
- Secure SDLC
- Usare piattaforme, framework e protocolli standard e sicuri
- Security review / PT

Agenda

- Introduzione a IoT
- IoT, IoE, IoM, M2M, IoS, CCS, ..
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Riferimenti

OWASP Internet of Things Project

https://www.owasp.org/index.php/OWASP_Internet_of_Things_Project

CIS Critical Security Controls

<https://www.sans.org/critical-security-controls>

NIST Cybersecurity for IoT Program

<https://www.nist.gov/programs-projects/nist-cybersecurity-iot-program>

IoT Security Foundation

<https://www.iotsecurityfoundation.org/>

GOV.UK - Secure by Design

<https://www.gov.uk/government/publications/secure-by-design>

Shodan - The search engine for Security ..

<https://www.shodan.io/>

Thinkst ConCollector (ricerca slide, econferenze di sicurezza informatica)

[http://cc.thinkst.com/ \(es. "zigbee"\)](http://cc.thinkst.com/)

IoT: utile di sicuro. Ma Sicuro?

Domande?

(grazie dell'attenzione)

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