

The Future of Internet Of Things (IoT)




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Disclaimer

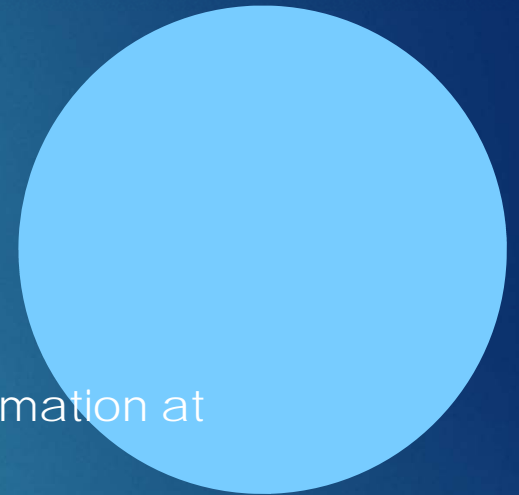
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whoami

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- ▶ Healthcare and education
- ▶ Information Security & Risks
- ▶ Organizer of Security BSides Boston 2013/2014. More information at <http://www.bsidesboston.com>
- ▶ A Medsec (Linkedin) and a "I Am The Cavalry" member
- ▶ @wr0 and websecr at gmail dot com or come say hi!



Agenda

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- ▶ Introduction to Internet Of Things (IoT)
- ▶ Problem
- ▶ Future
- ▶ Risks, followed by an Apple IOS example
- ▶ Recommendations

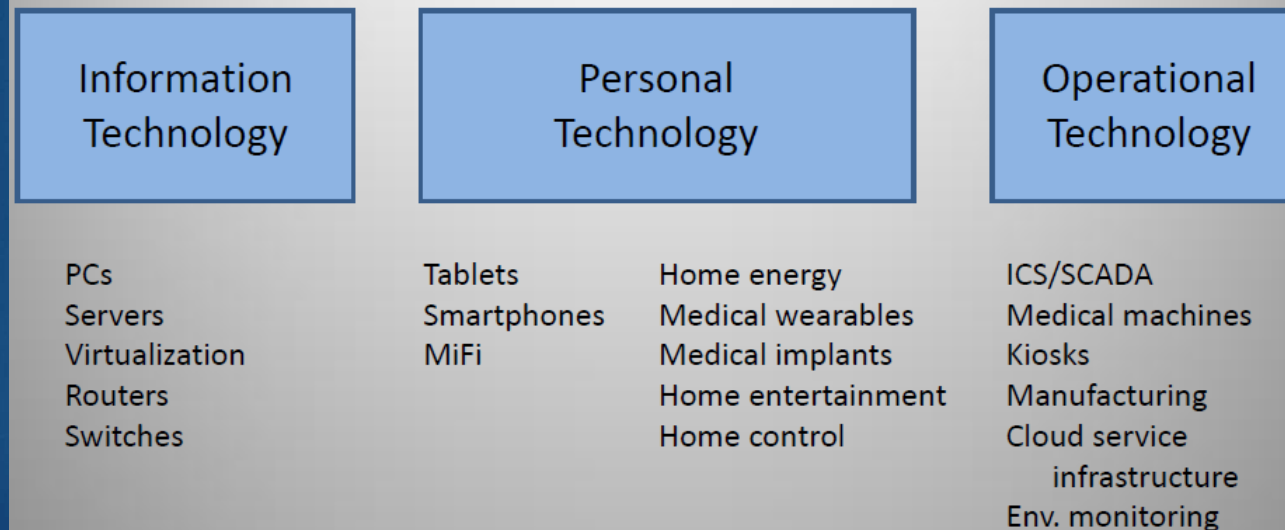


Introduction

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- ▶ " " = Healthier, efficient, stronger
- ▶ What are you wearing today?

Simple View of the Internet of Things



SANS Webcast, "Securing the Internet Of Things"

Introduction

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- ▶ These can be (and not limited to):

garage door openers
medical devices
mobile devices
cellphones
vehicles
watches
glasses
light bulbs
sensors
appliances
toothbrushes
hearing aids
smart tvs



Introduction

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- ▶ IoT
 - ▶ Embedded (OS, Applications)
 - ▶ Heterogeneous
 - ▶ Multiple interfaces
 - ▶ Consumer-driven
 - ▶ Impacts people (health, safety, privacy)
 - ▶ Many and multiple years lifecycle



Problem

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- ▶ The Internet has connected any thing . . .

15 Billion Internet-Connected Devices by 2015

15B

CONNECTED
DEVICES IN 2015



40B

CONNECTED
DEVICES BY 2020



= 1B DEVICES

<http://www.silabs.com/products/pages/internet-of-things.aspx>

Problem

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7,255,210,285

15 Billion Internet-Connected Devices by 2015

15B

CONNECTED
DEVICES IN 2015



40B

CONNECTED
DEVICES BY 2020

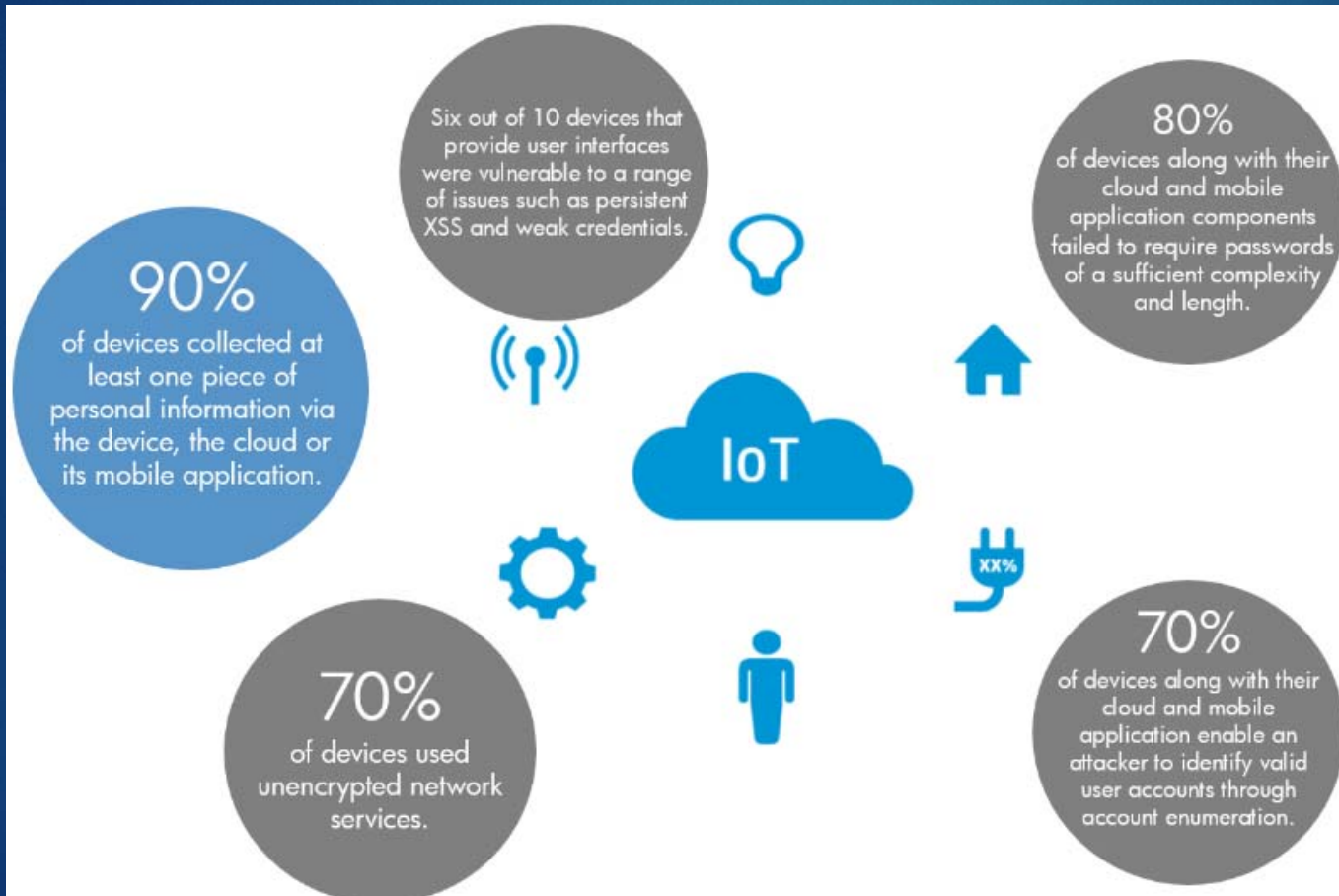


 = 1B DEVICES

<http://www.silabs.com/products/pages/internet-of-things.aspx>

Results

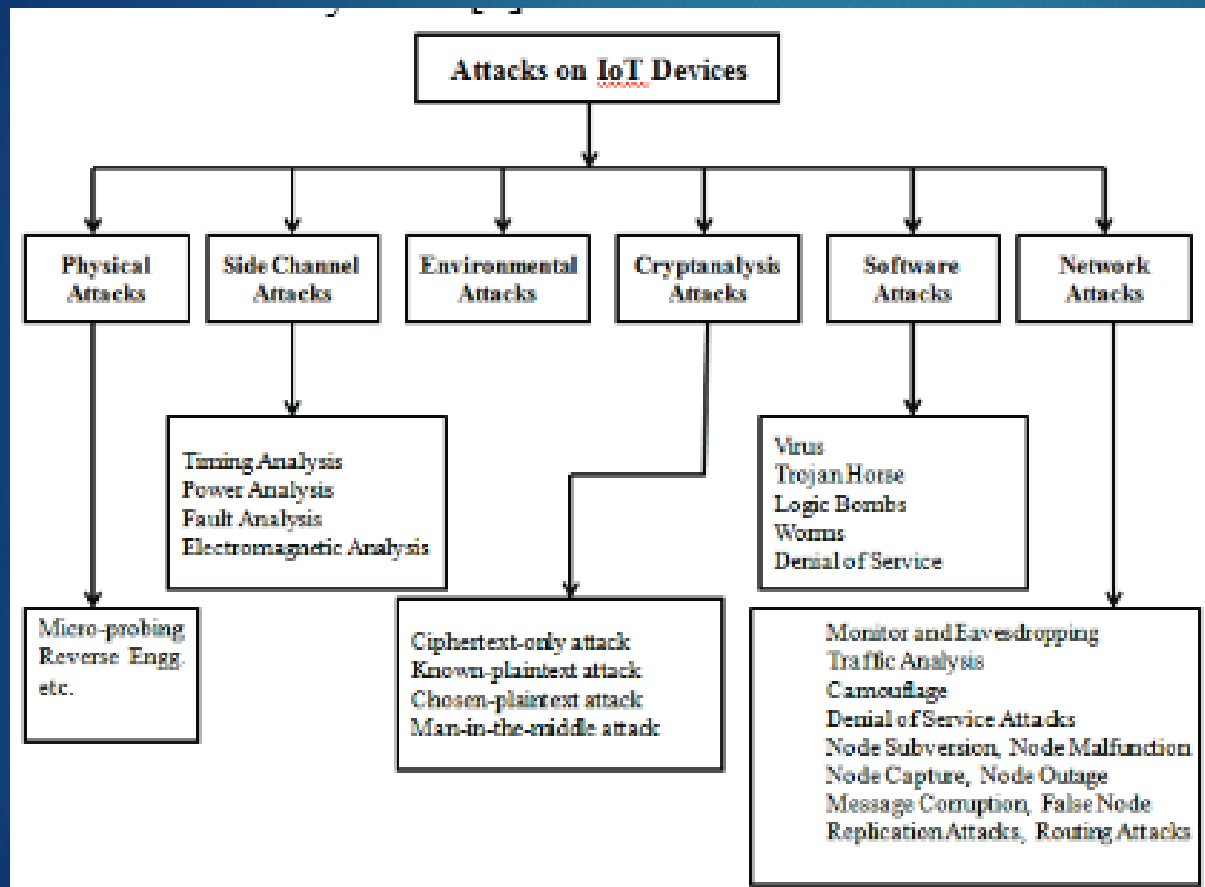
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http://fortifyprotect.com/HP_IoT_Research_Study.pdf

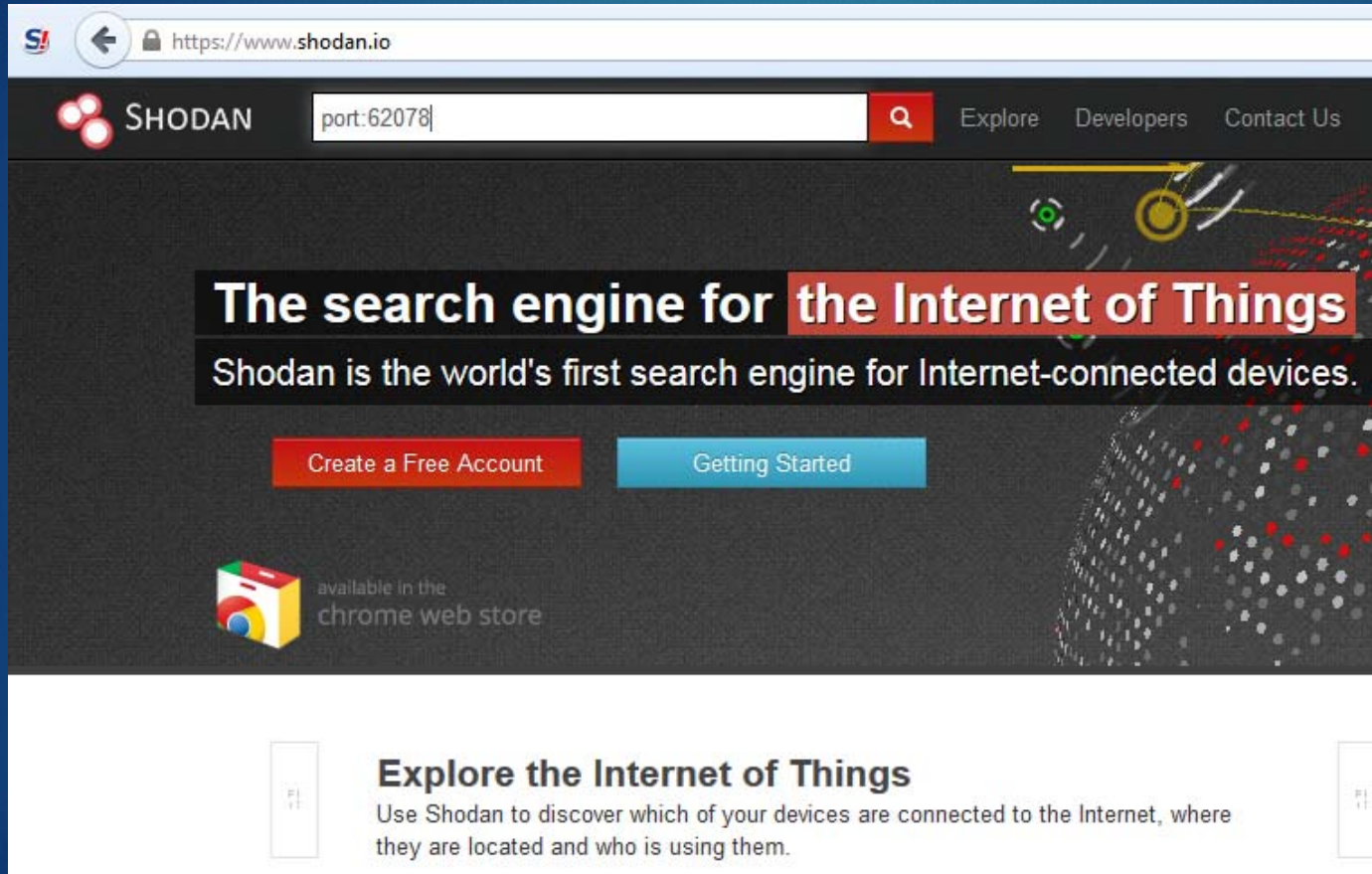
Attacks on IoT

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Got Shodan ?

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The screenshot shows the Shodan website homepage. At the top, there is a navigation bar with the Shodan logo, a search bar containing the text "port:62078", and links for "Explore", "Developers", and "Contact Us". Below the navigation bar, a large banner features the text "The search engine for the Internet of Things" in white, with "the Internet of Things" highlighted in a red box. Below this, it says "Shodan is the world's first search engine for Internet-connected devices." Two buttons are present: "Create a Free Account" in red and "Getting Started" in blue. Further down, there is a section for the Chrome Web Store with a "P" icon and the text "available in the chrome web store". At the bottom, a section titled "Explore the Internet of Things" includes the text "Use Shodan to discover which of your devices are connected to the Internet, where they are located and who is using them." The background of the banner shows a network of nodes and connections.

SHODAN

port:62078

Explore Developers Contact Us

The search engine for the Internet of Things

Shodan is the world's first search engine for Internet-connected devices.

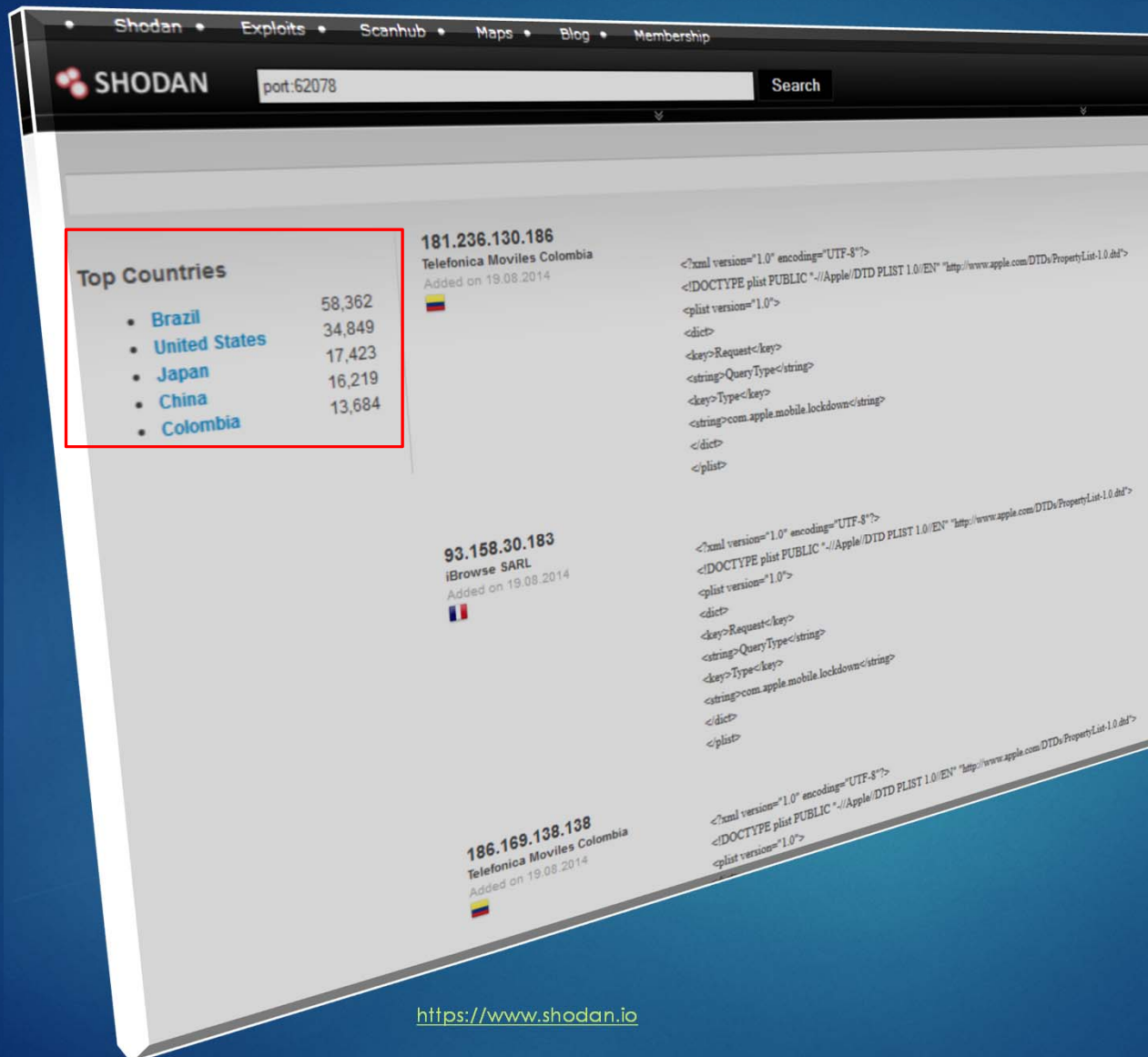
Create a Free Account Getting Started

available in the chrome web store

Explore the Internet of Things

Use Shodan to discover which of your devices are connected to the Internet, where they are located and who is using them.

<https://www.shodan.io>



Average Internet of Things device has 25 security flaws

In a study of ten devices including home thermostats, remote power outlets and door locks, HP found 250 potentially dangerous security vulnerabilities

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Ikea's vision of the connected home is one that should be adopted by businesses Photo: IKEA

<http://www.telegraph.co.uk/technology/internet-security/11000013/Average-Internet-of-Things-device-has-25-security-flaws.html>

Recommendations

- ▶ Conduct a review of all the device components
- ▶ Implement security standards before any implementation
- ▶ Ensure that security is throughout the lifecycle
- ▶ Thoroughly keep testing and testing again
- ▶ Hire a third party for testing
- ▶ Work and network with other colleagues and IoT groups and manufacturers
- ▶ Review IoT security frameworks
- ▶ AoT?



Questions

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- ▶ ???
- ▶ ??
- ▶ ?



Resources

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- ▶ Hackable Light Bulbs, <http://www.infosecurity-magazine.com/news/for-the-internet-of-things-even-a/>
- ▶ Internet of Everything Secure Framework, <http://blogs.cisco.com/sp/internet-of-everything-ioe-secure-framework/>
- ▶ Security Framework for IoT, <http://www.infosecurity-magazine.com/news/mcafee-plots-security-framework/>
- ▶ Shodan, <http://www.shodanhq.com>
- ▶ Smart TVs, <http://www.infosecurity-magazine.com/news/black-hat-2013-researchers-demo-how-smart-tvs-can/>
- ▶ The CIA Fears of IoT, <http://www.nextgov.com/defense/2014/07/cia-fears-internet-things/89819/>
- ▶ The Open Interconnect Consortium ,<http://openinterconnect.org/>