



Are you ready for **IoT**
to change our **buildings?**



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The Bicsi logo, featuring the word "Bicsi" in a white, italicized, sans-serif font with a thin white arc above the letters "i" and "s".

Bicsi



Pook-Ping "Ping" Yao
CEO, Optigo Networks Inc.
Vancouver, BC, Canada



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Agenda

- Why the Internet of Things in Buildings?
- IoT: The 4th Industrial Revolution
- Reshaping Commercial Real Estate
- How Does IoT Affect Us? IT and OT in Smart Buildings
- Cybersecurity and IoT



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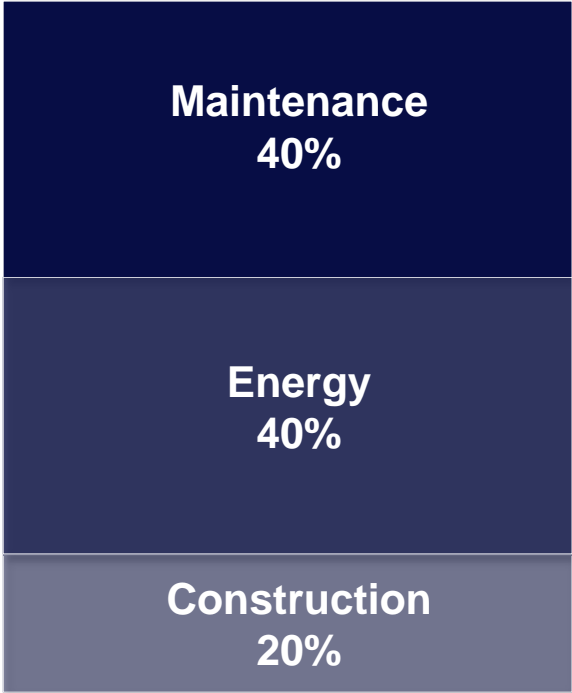
Why the **Internet of Things** in **Buildings?**



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Lifetime Cost of Buildings



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IoT: The 4th Industrial Revolution

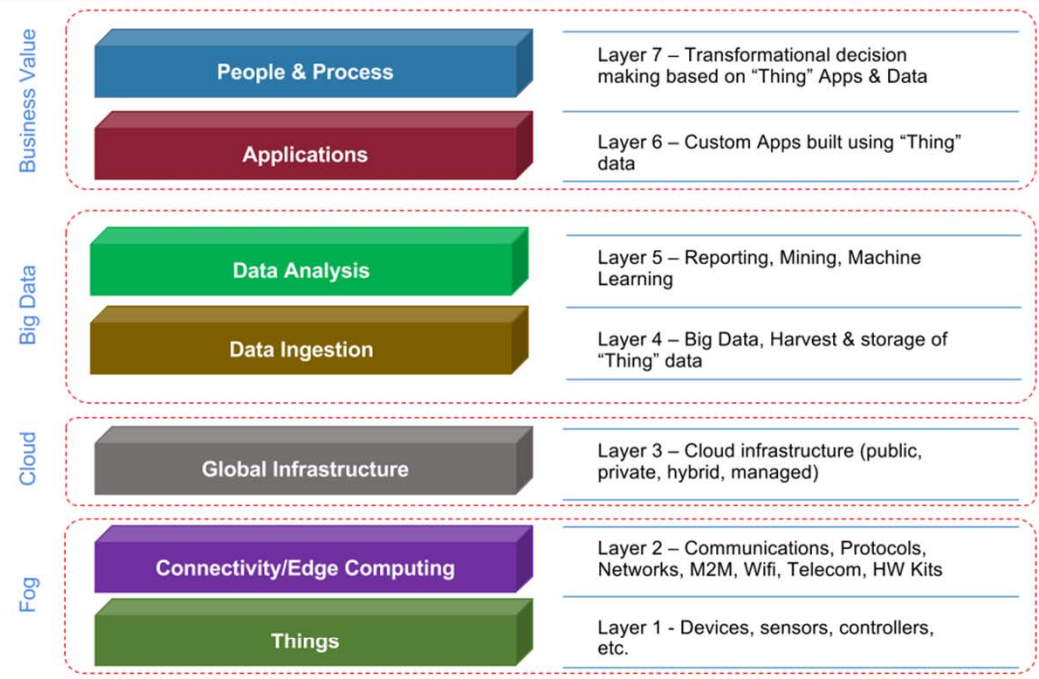


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7 Layers of the Internet of Things (IoT)



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Connected “Things” Forecast:

6.4 Billion in 2016

21 Billion in 2020

<https://www.cnbc.com/2016/02/01/an-internet-of-things-that-will-number-ten-billions.html>

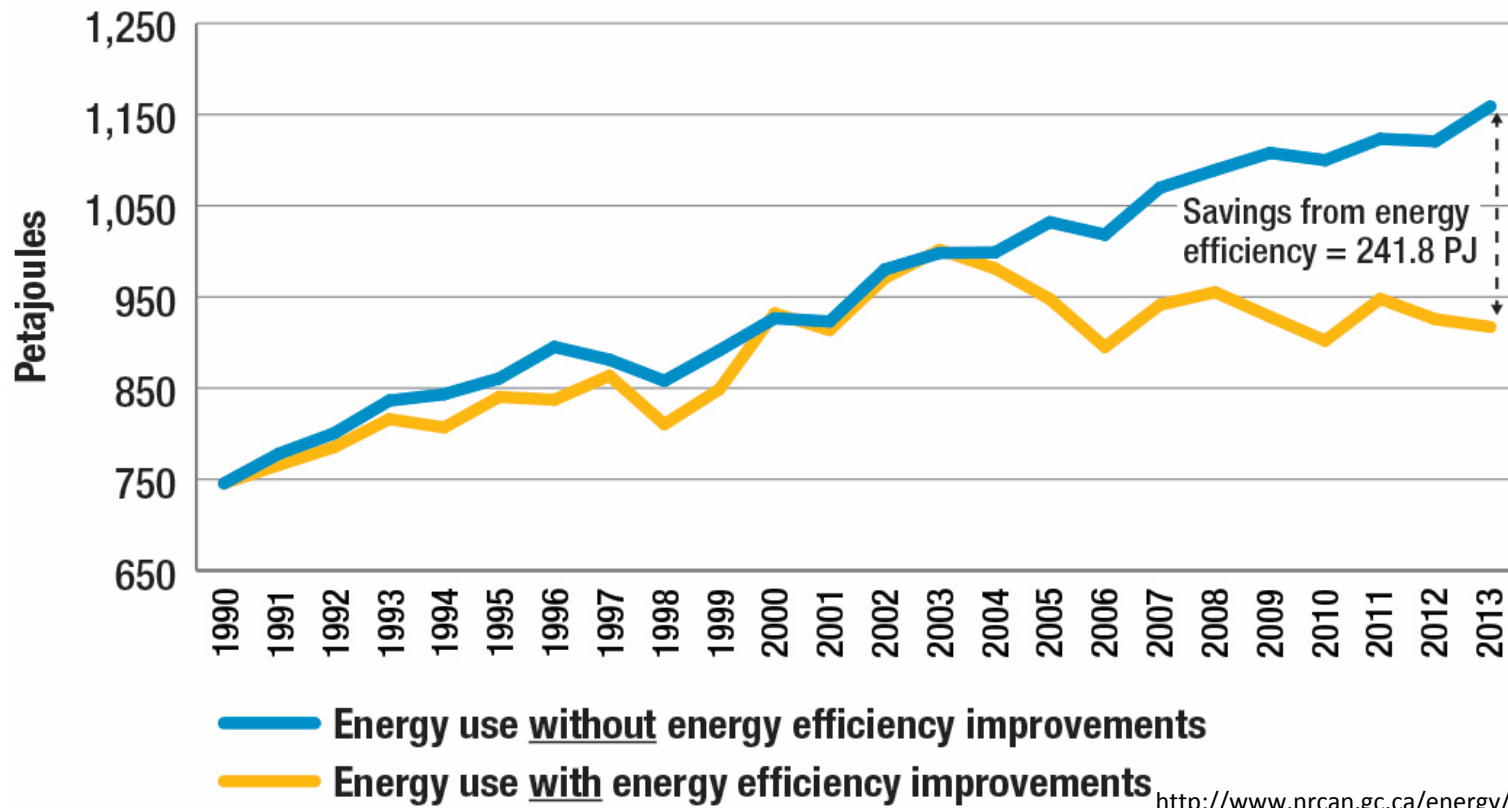


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Reshaping Commercial Real Estate

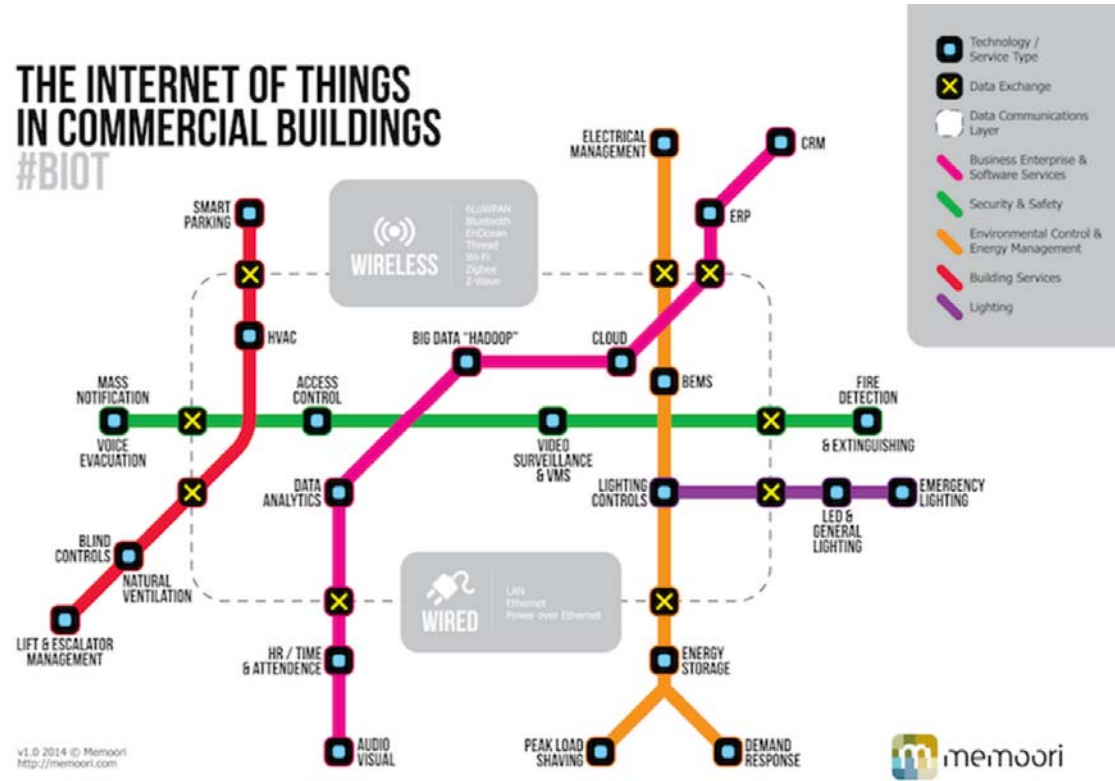


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THE INTERNET OF THINGS IN COMMERCIAL BUILDINGS #BIOT



<http://www.memoori.com/global-market-internet-things-smart-buildings-will-rise-85bn-2020/>

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“Global Market for the Internet of Things in Smart Buildings will rise to over **\$85 Billion by 2020”**

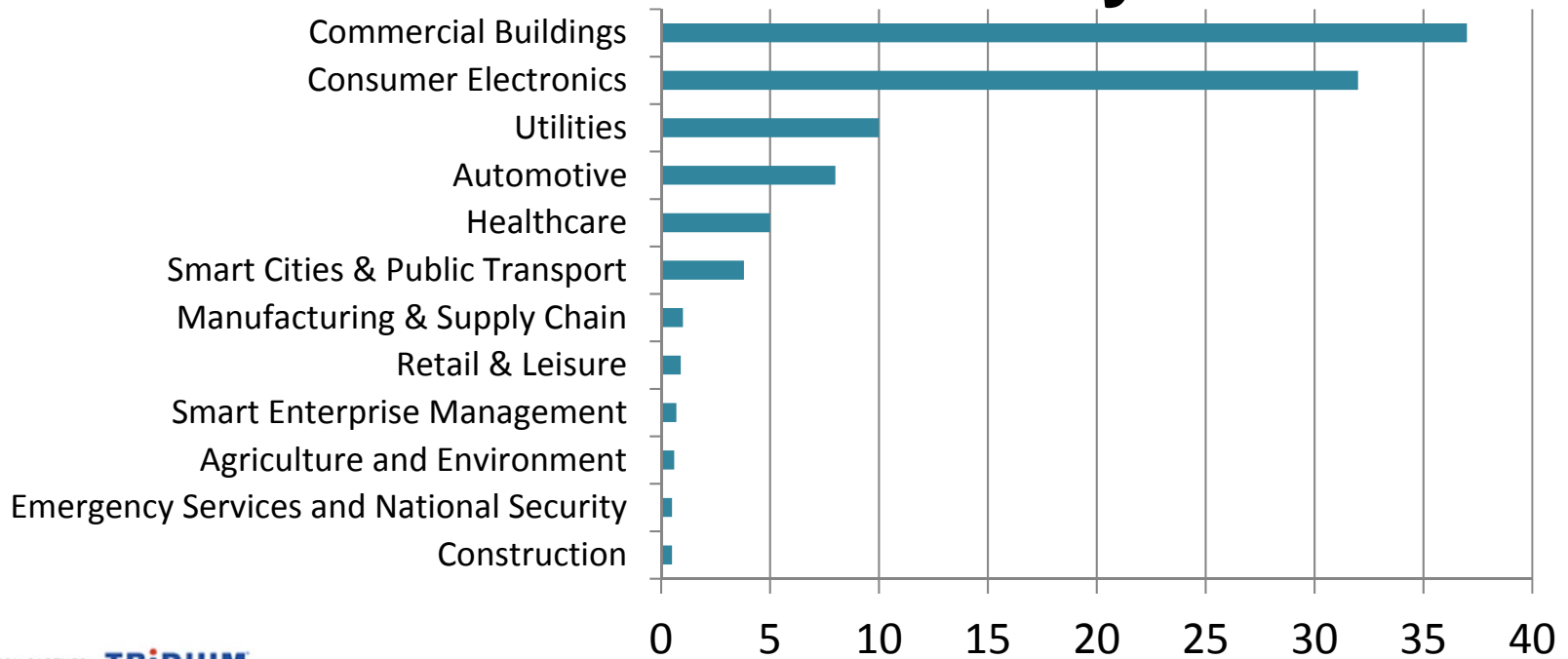
– Memoori

<http://www.memoori.com/global-market-internet-things-smart-buildings-will-rise-85bn-2020/>



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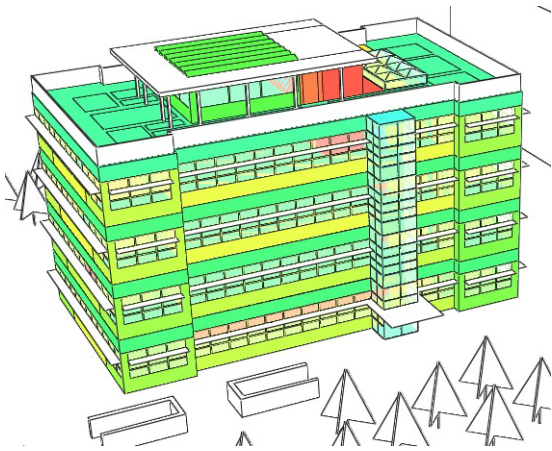
Connected Devices by 2022



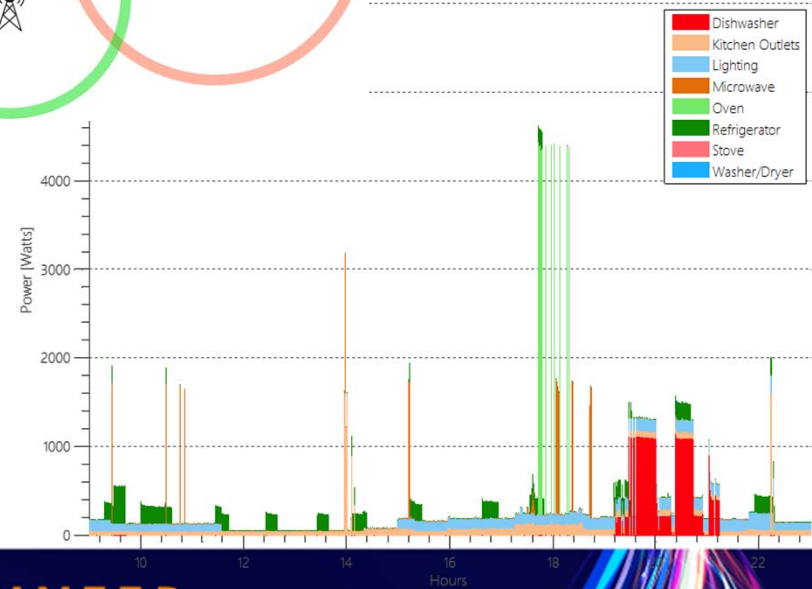
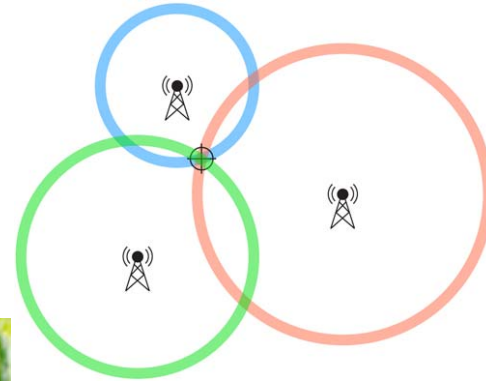
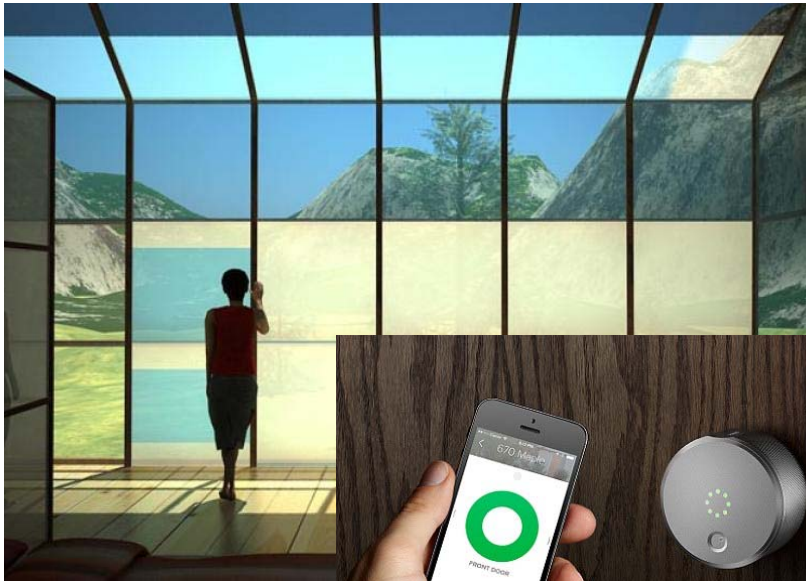
EDUCATION PARTNER: **TRiD!UM**

Source: Machina Research 2012

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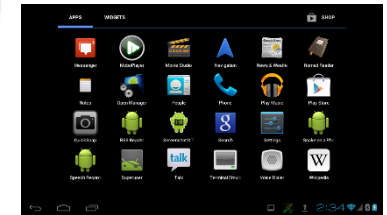
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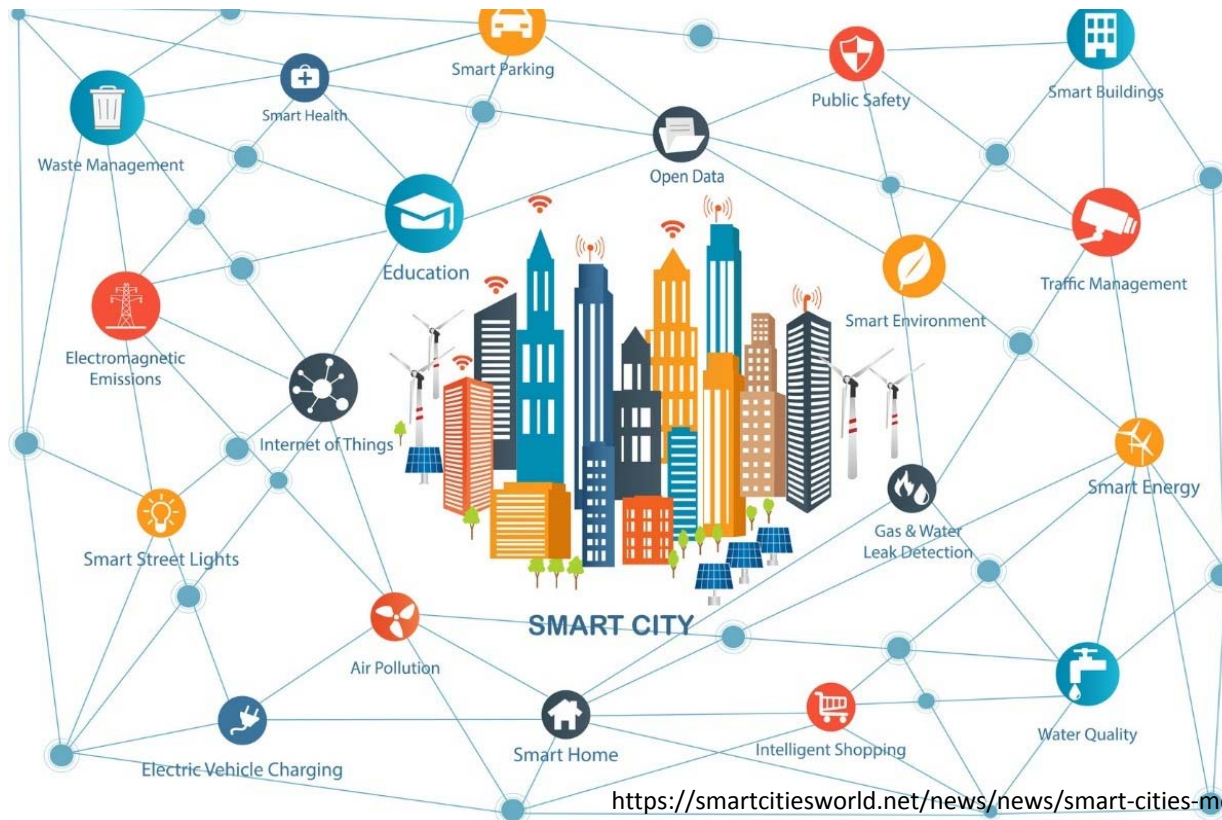
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How Does **IoT** Affect Us? **IT and OT** in Smart Buildings



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New skills:

- IP Networking
- General IT
- Software coding
- Vendor Management
- Industry Specialization
- Privacy & Security

<http://maxpixel.freegreatpicture.com/Building-Employee-Builder-Worker-Professional-2762236>
<https://www.flickr.com/photos/dfataustralianaid/10729848585>

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Information Technology

Operational Technology



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	Service	Bandwidth	Device Churn	Internet?	Traffic Pattern
OT	Surveillance/CCTV	Significant	Replace-on-fail	Typically No	Planned
	Access Control	Very Low	None	No	Predictable
	Lighting	Very Low	Replace-on-fail	No	Predictable
	Elevator	Very Low	None	No	Predictable
	HVAC	Very Low	None	No	Predictable
	Power Metering	Low	None	Single destination	Predictable
IT	Email	Variable	High	Yes	Sporadic
	File Sharing	Variable	High	Yes	Sporadic
	Video Conference	High/Variable	Medium	Yes	On / Off
	Enterprise Apps	Low/Medium	Medium	Varies	Sporadic

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Cybersecurity and IoT



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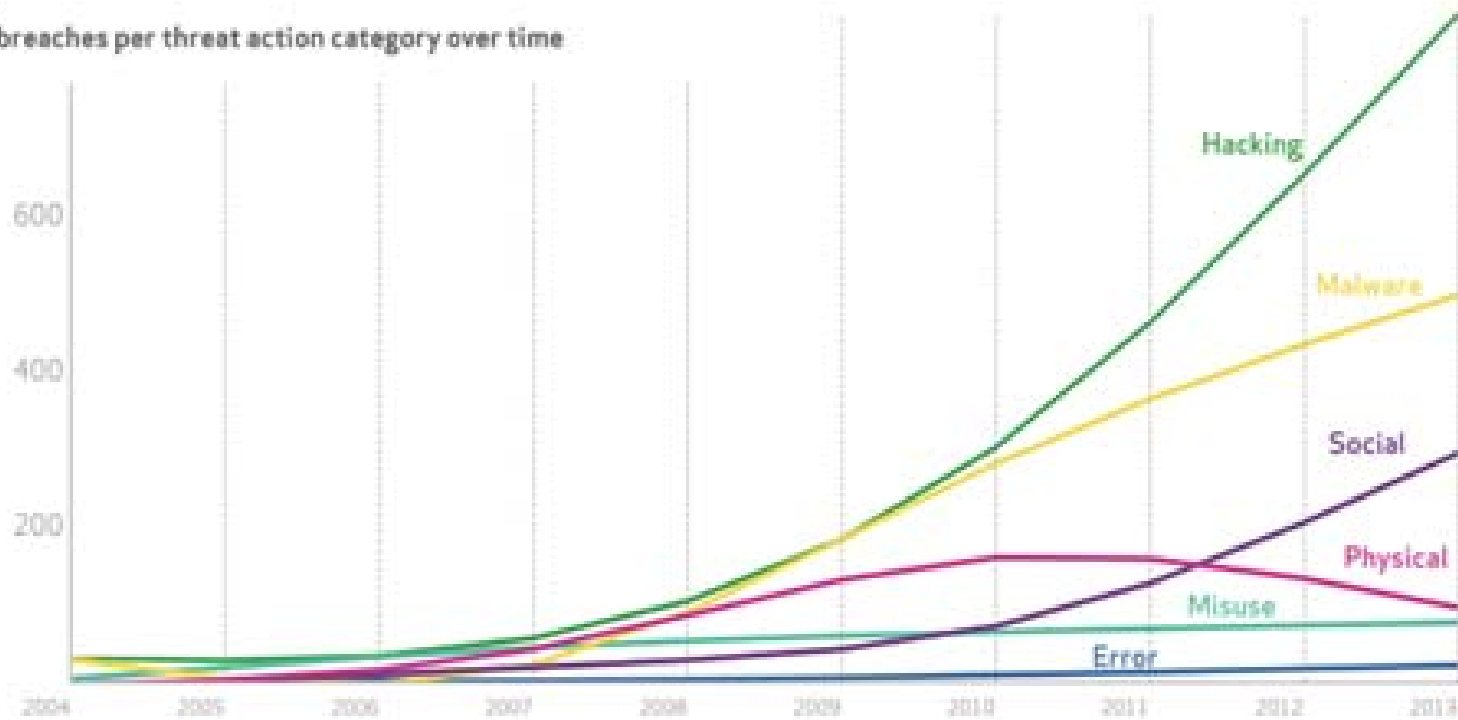
“Cybersecurity Market Reaches \$75 Billion in 2015; Expected to Reach \$170 Billion by 2020”

<http://www.forbes.com/sites/stevemorgan/2015/12/20/cybersecurity%E2%80%8B-%E2%80%8Bmarket-reaches-75-billion-in-2015%E2%80%8B%E2%80%8B-%E2%80%8Bexpected-to-reach-170-billion-by-2020/#35bcbe692191>



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Figure 8.
Number of breaches per threat action category over time



VERIZON 2014 DATA BREACH INVESTIGATIONS REPORT

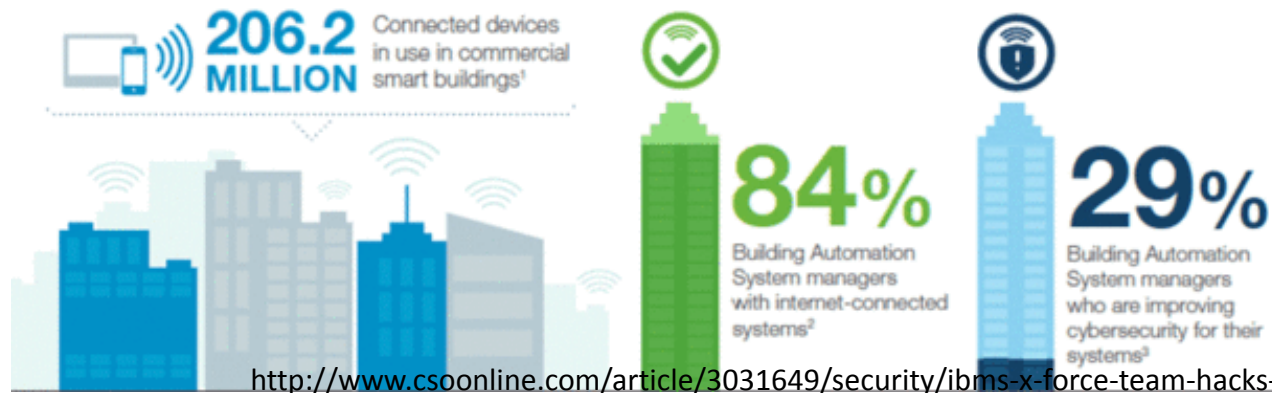
<http://resources.infosecinstitute.com/2013-data-breaches-need-know/>

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Smart Buildings

A Back Door for Hackers?

Connected Building Systems Fly under the Cybersecurity Radar, Creating "Shadow IoT"



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- General +
- Vulnerabilities +
- Vulnerability Metrics +
- Products +
- Configurations (CCE)
- Contact Us
- Other Sites +
- Search +



New Data Feeds



CPE Ranges



Vulnerability Visualizations

The NVD is the U.S. government repository of standards based vulnerability management data represented using the Security Content Automation Protocol (SCAP). This data enables automation of vulnerability management, security measurement, and compliance. The NVD includes databases of security checklist references, security-related software flaws, misconfigurations, product names, and impact metrics.

Last 20 Scored Vulnerability IDs & Summaries

CVSS Severity

CVE-2017-16753 — An Improper Input Validation issue was discovered in Advantech WebAccess versions prior to 8.3. WebAccess allows some inputs that may cause the program to crash. Published: January 05, 2018; 03:29:00 AM -05:00	V3: 7.5 HIGH V2: 5.0 MEDIUM
CVE-2017-16720 — A Path Traversal issue was discovered in WebAccess versions prior to 8.3. An attacker has access to files within the directory structure of the target device. Published: January 05, 2018; 03:29:00 AM -05:00	V3: 7.5 HIGH V2: 5.0 MEDIUM
CVE-2017-16716 — A SQL Injection issue was discovered in WebAccess versions prior to 8.3. WebAccess does not properly sanitize its inputs for SQL commands. Published: January 05, 2018; 03:29:00 AM -05:00	V3: 9.8 CRITICAL V2: 7.5 HIGH
CVE-2018-5220 — In K7 Antivirus 15.1.0306, the driver file (K7Sentry.sys) allows local users to cause a denial of service (RSOD) or possibly have unspecified other impact because of not validating input.	V3: 7.8 HIGH V2: 6.1 MEDIUM

<https://nvd.nist.gov/>

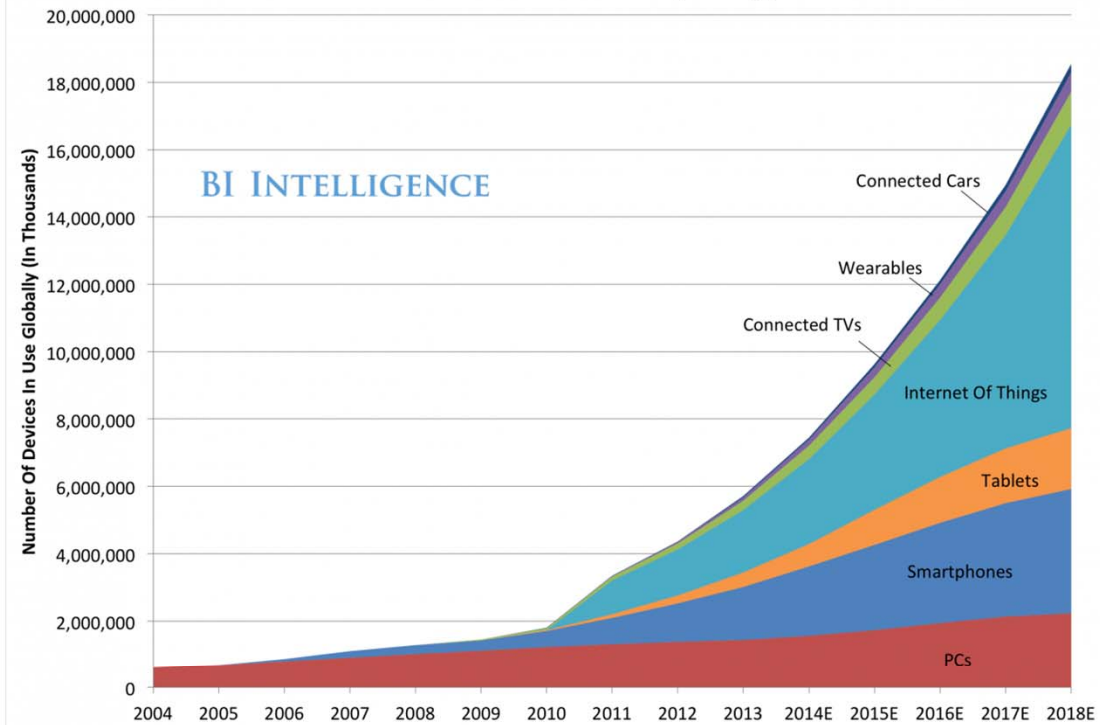
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Summary



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The Internet Of Everything



Source: BI Intelligence Estimates

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Operational Technology



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Smart Buildings

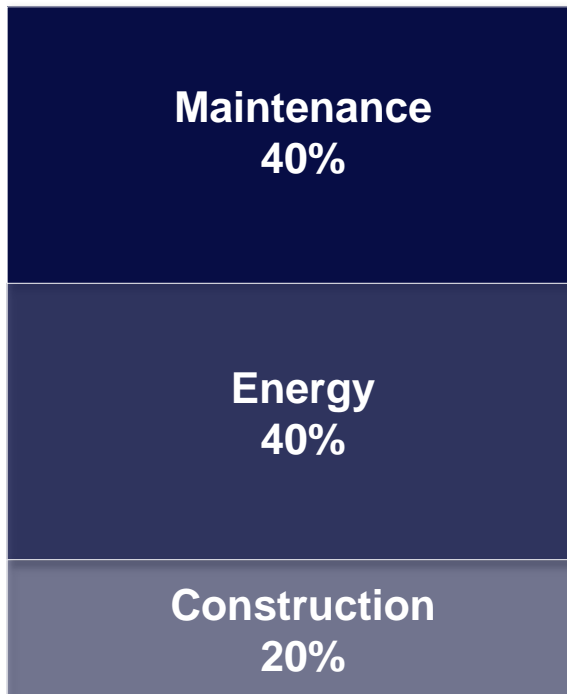
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Lifetime Cost of Buildings



Building IoT to improve:

- Tenant happiness
- Energy efficiency
- Maintenance costs
- Security

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Thank you.



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