

DIGITAL - Institute for Information and Communication Technologies



Security aspects related to smart appliances

Marksteiner, Vallant

Ecodesign Preparatory study on Smart Appliances

Stakeholder meeting, 30 May 2016

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www.joanneum.at

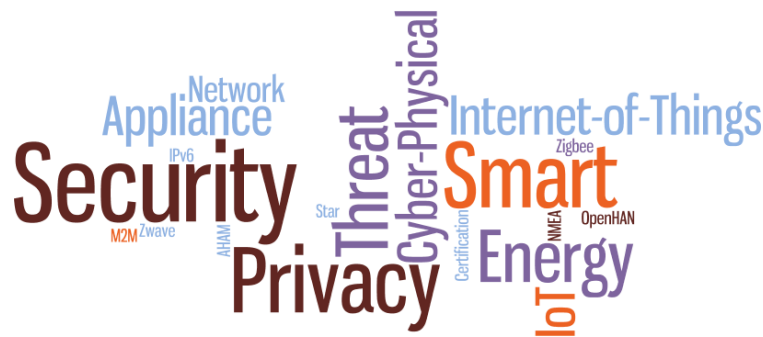
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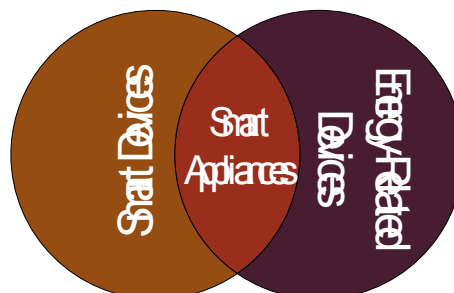
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Smart Things



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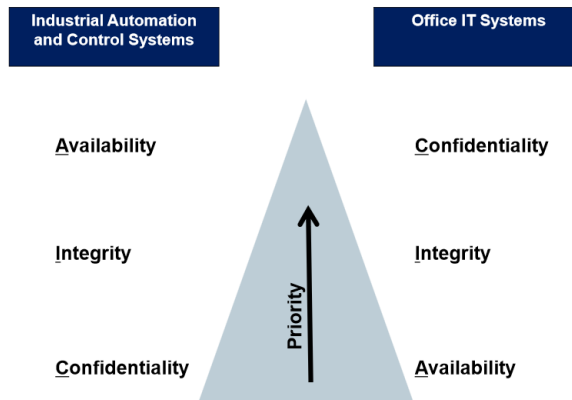
Smart Appliances



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Security Priority Conflict in CPS



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Source: (Falk & Fries, 2015)

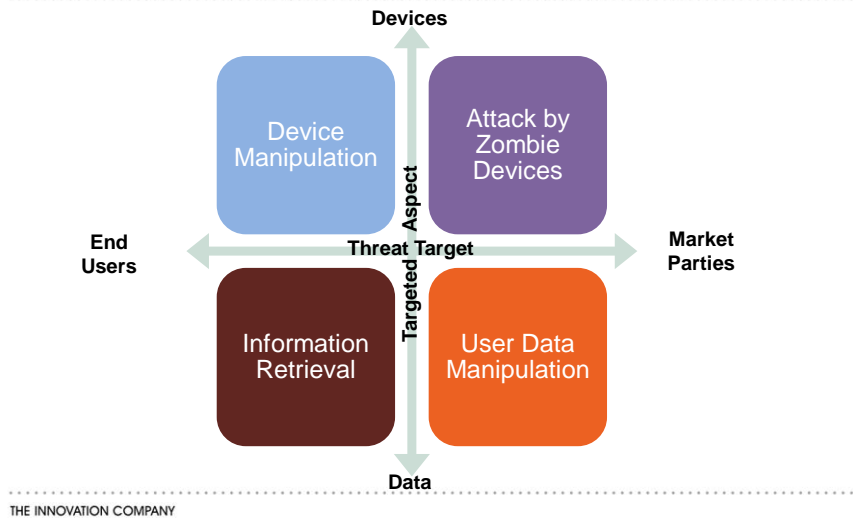
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Threats

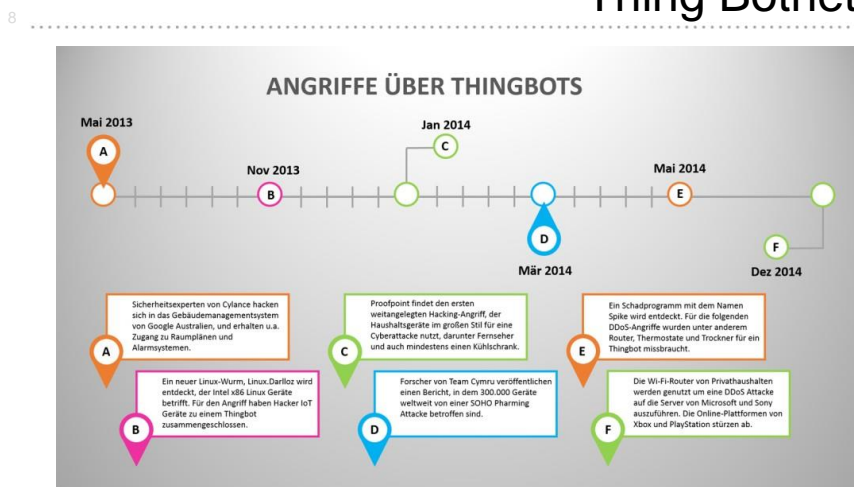


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Threats (cont.)

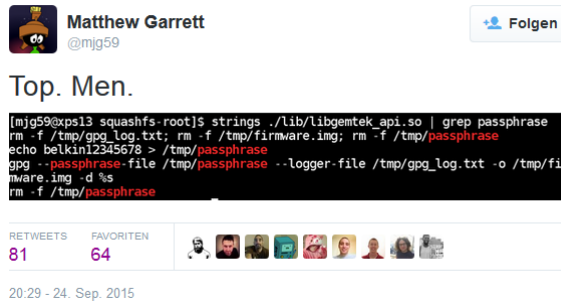


Thing Botnets



9

„Intelligent“ Light Switch



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Source: (Garrett/Twitter, 2015)

10

Smart TV Spying on Its Users



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Image Source: www.digitaltrends.com/home-theater/samsung-smart-tv-plex-pop-up-ads-yahoo

11

Smart Meter Manipulation

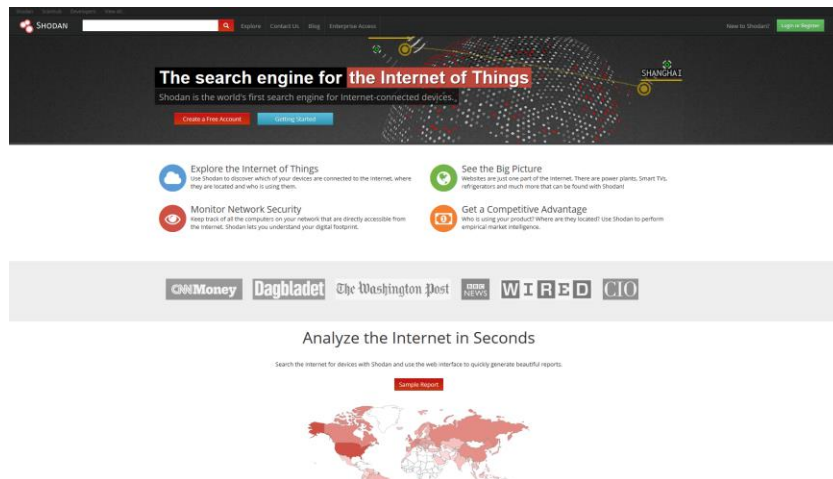


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Image Source: ap/Pat Sullivan at <http://futurezone.at/digital-life/smart-meter-skandal-in-malta-aufgedeckt/53.143.748>

12

Exposure



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Image source: www.shodan.io

13

Security – Cryptography Can Help

- Encrypt communications
- Also authenticate and integrity-check
- Difficulty: doing it right
- Secure stored data
- Difficulty: key management



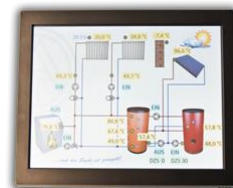
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Image source: istock/Henrik5000

14

Security – Think in Layers

- Perimeter helps, but is not enough
- Wireless Protocols are problematic
- Segregation helps, but is not enough
- Defense-in-depth: Device hardening



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Security - Processes & Training

- Avoid laziness in access control
- Train resellers/installers
- Generate end-user awareness
- May add some inconvenience

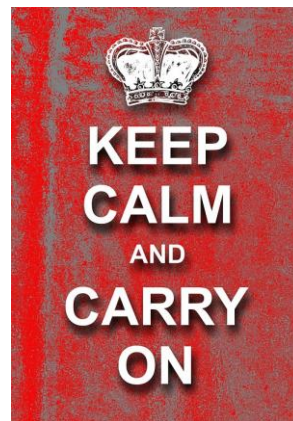


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Security– Keeping the Level Up

- Introduce monitoring
- Update regularly
- May add some inconvenience



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Privacy – Right to be forgotten

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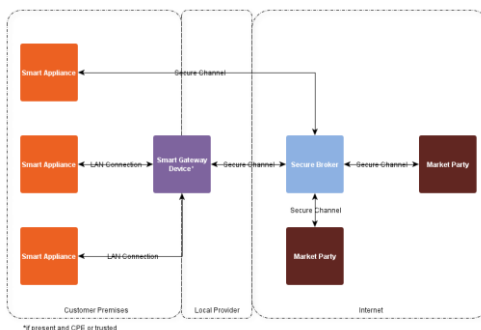
- European General Data Protection Directive
- A strict segregation between appliance and personal data is useful
- Protection difficult to execute in practise



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Privacy - Secure Broker

18



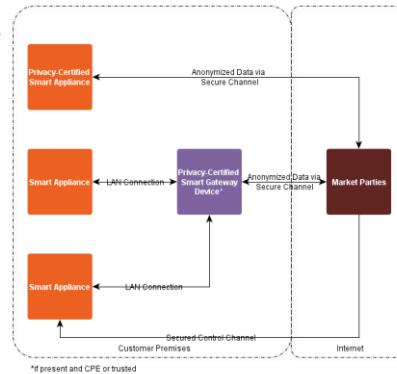
- The only way to actually prevent data selling is not to give them away
- Achieved by trusted third party
- Similar to an Appstore

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Privacy - Certified Devices

- Smart Devices anonymize and aggregate
- Aggregation device- and time-based
- Devices need to be certified
- Market parties may send unidirection control signals



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Privacy - Watermarking

- Steganography
- Established technique
- Does not prevent misuse but enables prosecution
- Lots of challenges ahead



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Certification



- Common Criteria Protection Profile
- Role model: Smart Meter PP
- Feasible for whole smart home environments?

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Need for Research

- Reference architectures
- Elaboration of privacy models
- Certification (and norms)
- Practical surveys



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Conclusion



- Defense-in-Depth
- Security by design
- Security by default
- It comes at some cost
- End user awareness

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Thank you for your interest!



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