

SIOTOME

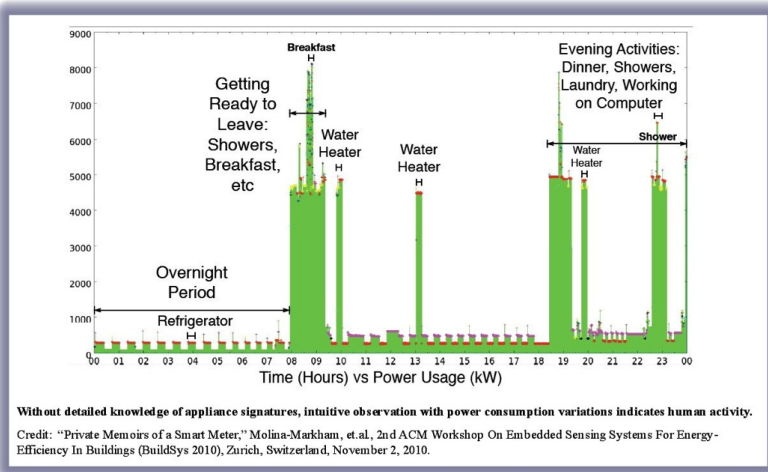
An Edge-ISP Collaborative Architecture for IoT Security

Hamed Haddadi

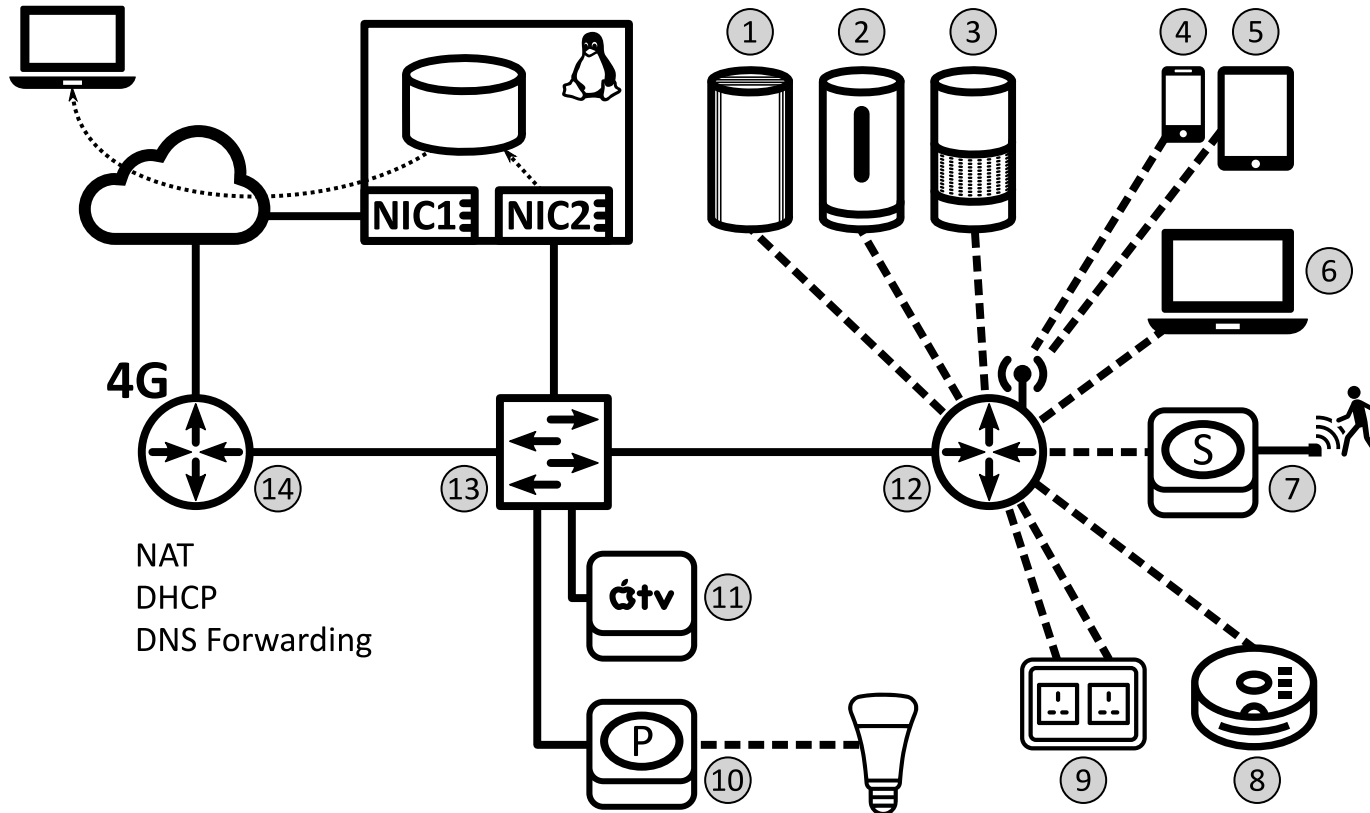
Joint work with: Vassilis Christophides, Renata Teixeira, Kenjiro Cho, Shigeya Suzuki, Adrian Perrig



IoT devices are entering our homes.

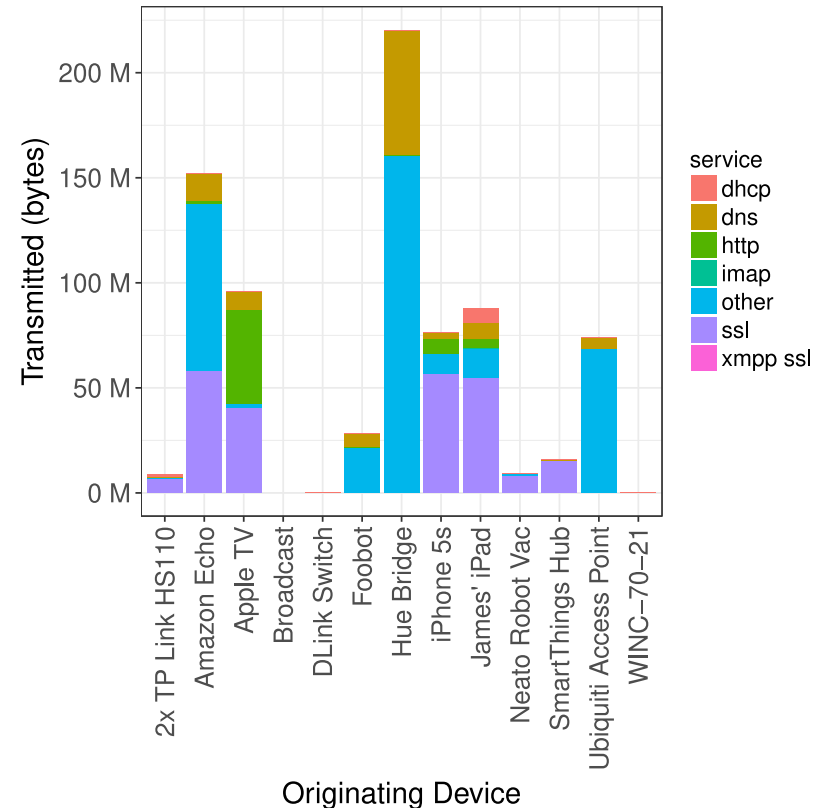
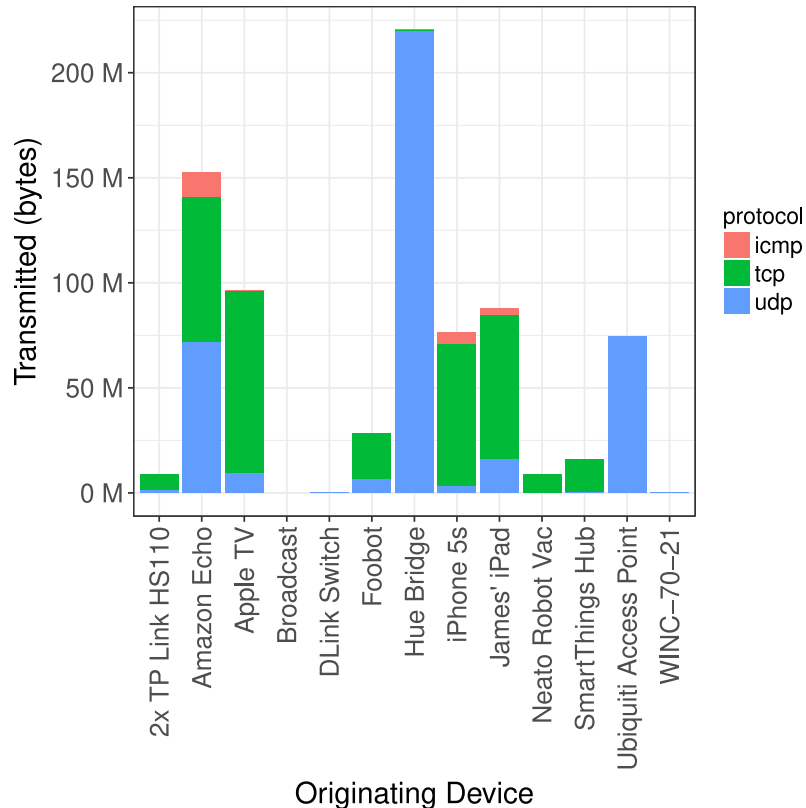


They generate lots of data, hard to classify!



Yousef Amar, Hamed Haddadi, Richard Mortier, Anthony Brown, James Colley, Andy Crabtree, "An Analysis of Home IoT Network Traffic and Behaviour", Available on [ArXiv](#), March 2018.

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Is ISP side monitoring enough?

- Too much data, too late?
 - Firewalls, NATs, middleboxes, proxies affecting the quality of the data
 - Visibility into WAN and coordinated attacks, but no visibility into particulars of the devices.
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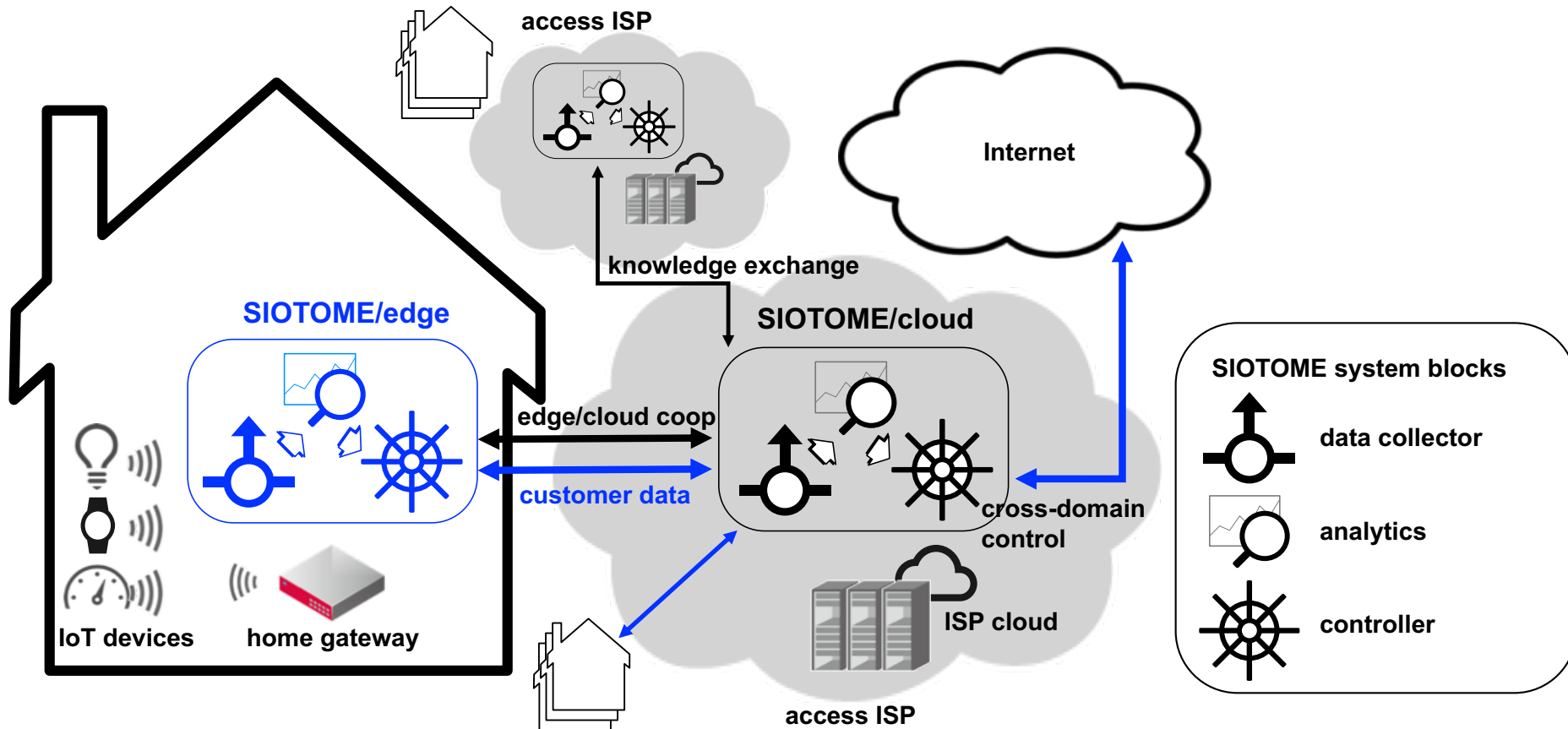
Can we rely on the edge?

- Smart devices, dumb defaults (enough has been said today!)
- firewalls and intrusion detection/prevention systems
- end-host based defenses (e.g., antivirus)
- However: Devices are getting more & more powerful

Challenges:

- Coordination across devices
 - Patching and updates
 - Unavailability of technical operators
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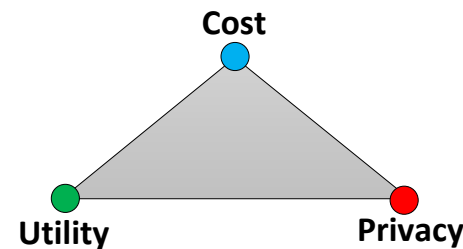
Architecture



<https://haddadi.github.io/privacy-preserving-edge-computing/>
<https://haddadi.github.io/Privacy-Preserving-Sensory-Analysis/>

First steps...

- Get enough attack data from events
- Set up a testbed and train models in a federated way
- Establish lightweight models on the edge
- Set up private feature sharing scheme with the ISP
- Establish utility, privacy, and cost bounds



Seyed Ali Osia, Ali Shahin Shamsabadi, Ali Taheri, Hamid R. Rabiee, Hamed Haddadi, "Private and Scalable Personal Data Analytics using a Hybrid Edge-Cloud Deep Learning", IEEE Computer, Special Issue on Mobile and Embedded Deep Learning, April 2018.

Thank You!

SIOTOME: An Edge-ISP Collaborative Architecture for IoT Security



<https://haddadi.github.io/>



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