

The Current State of Access Control for Smart Devices in Homes

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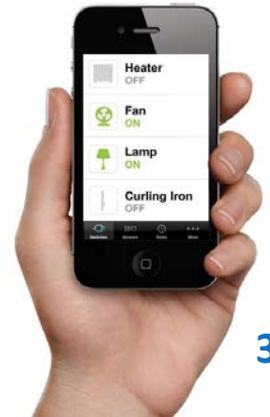
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Smart Devices

- Smart devices: Household devices that are connected to the Internet
- Now marketed to average consumers

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Access Control

- Security is a major barrier to adoption
- Many different models of access control are theoretically possible

A.J. Bernheim Brush, Bongshin Lee, Ratul Mahajan, Sharad Agarwal, Stefan Saroiu, Colin Dixon. Home Automation in the Wild: Challenges and Opportunities. In *Proc. CHI 2011*.

Access Control

- Security is a major barrier to adoption
- Many different models of access control are theoretically possible
- **What access-control affordances do current devices provide?**

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Three Case Studies

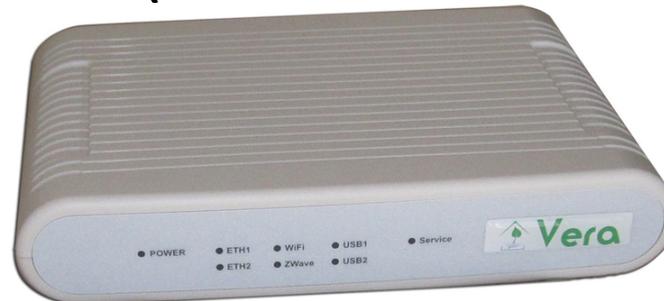
1. LED Lighting System: Philips Hue



2. Wireless Scale: Withings WS-30



3. Wireless Door Lock: Kwikset 910 TRL ZW and Mi Casa Verde Vera 3 (Z-Wave controller)



Configuration

- *Lighting system*: Plug hub into router (Ethernet), press button on hub to pair with phone
 - Optionally create account
- *Scale*: Pair over Bluetooth with phone, provide Wi-Fi credentials, create mandatory account
- *Lock*: Pair with Z-Wave controller by pressing button on lock

Who Can Control / Access?

- *Lighting system*: Same Wi-Fi network & paired with hub OR know account credentials OR proximity
- *Scale*: Anyone whose account or email address has been granted access
- *Lock*: Same Wi-Fi network OR has account on Z-Wave controller

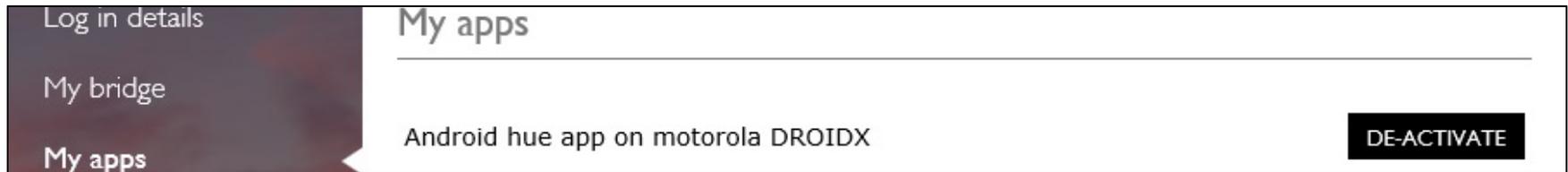
Scale's Sharing Affordances

Sharing

-  Share my data with the other users of my scale
-  Share my data with other Withings accounts
-  Share my data with my doctor
-  Share on social networks
-  Share on my website
-  Save my data and print my graphs

Roles

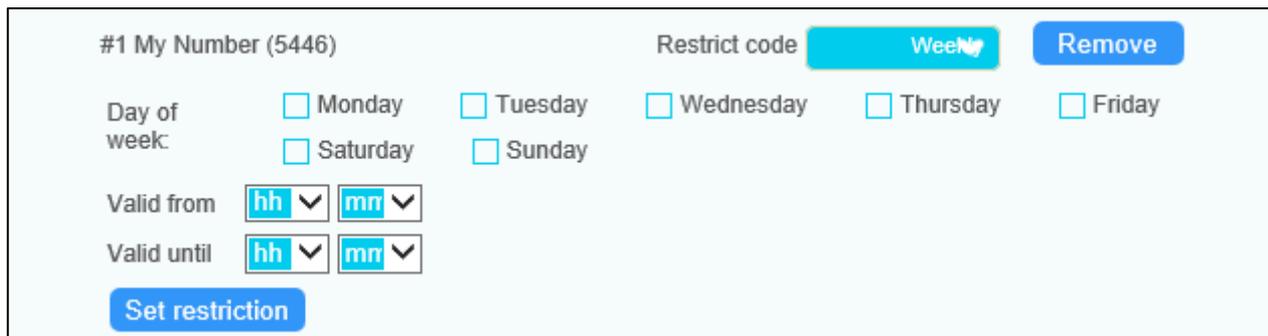
- *Lighting system*: None



- *Scale*: Separate accounts, email sharing

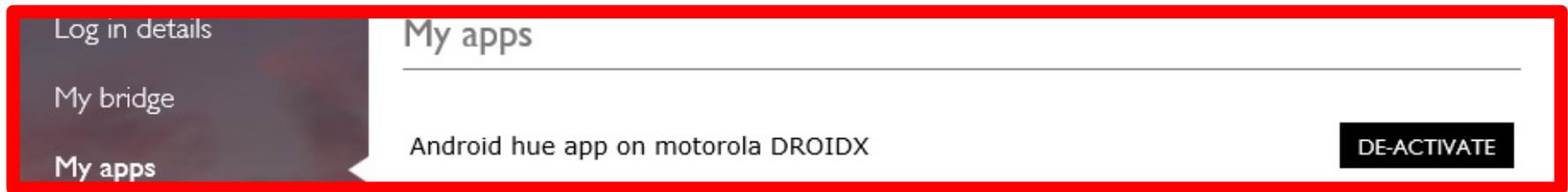


- *Lock*: PIN or {Administrator, guest, notification-only}



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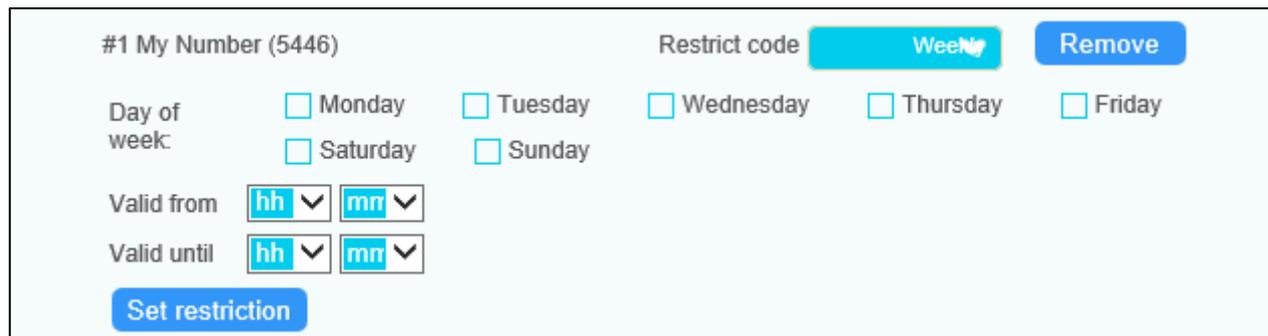
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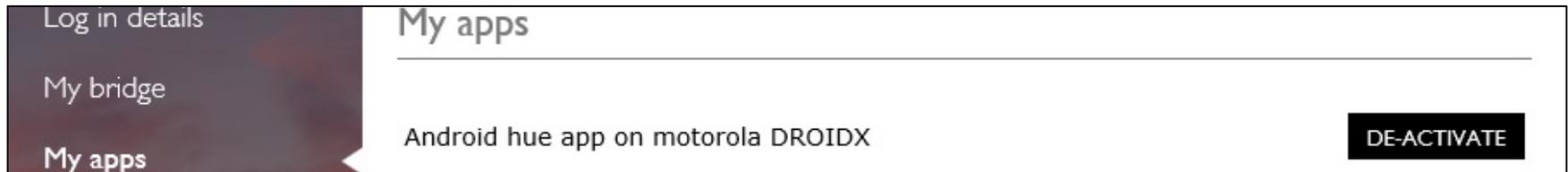


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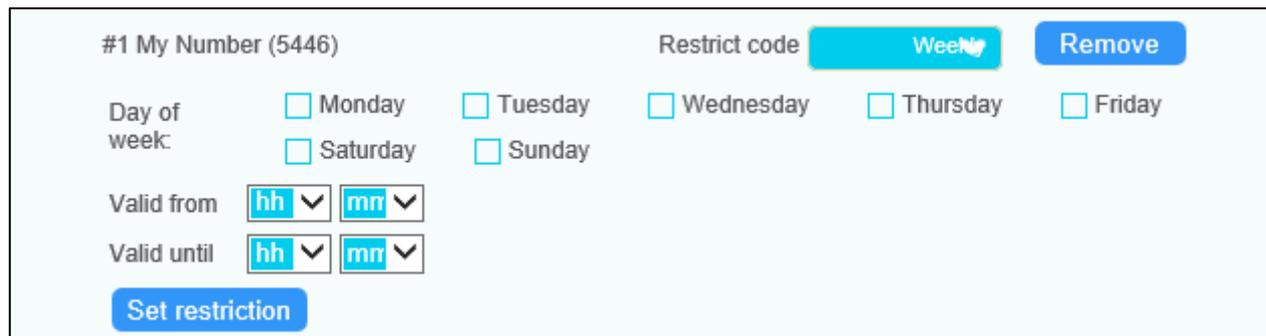
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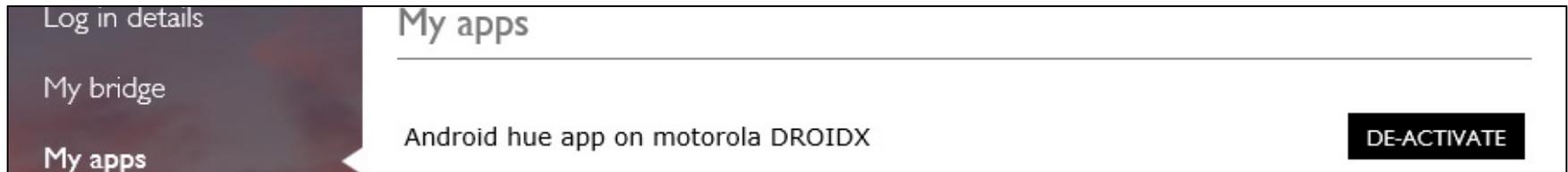


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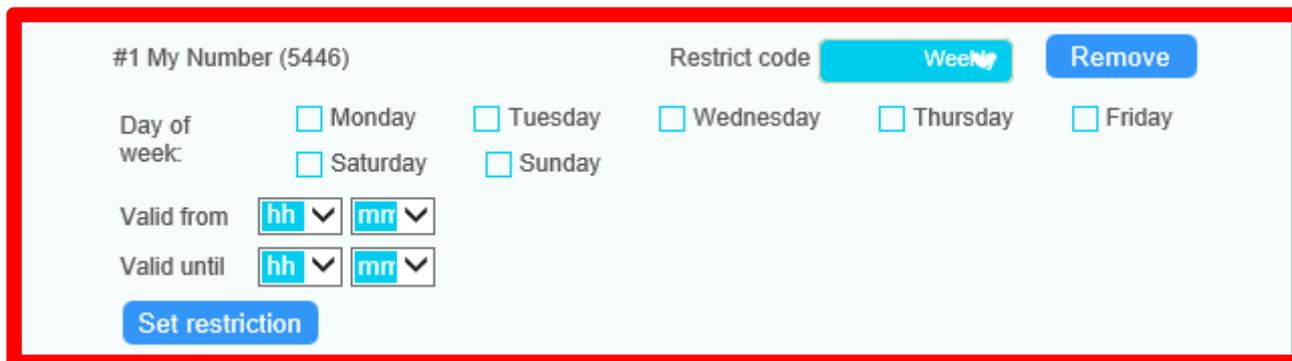
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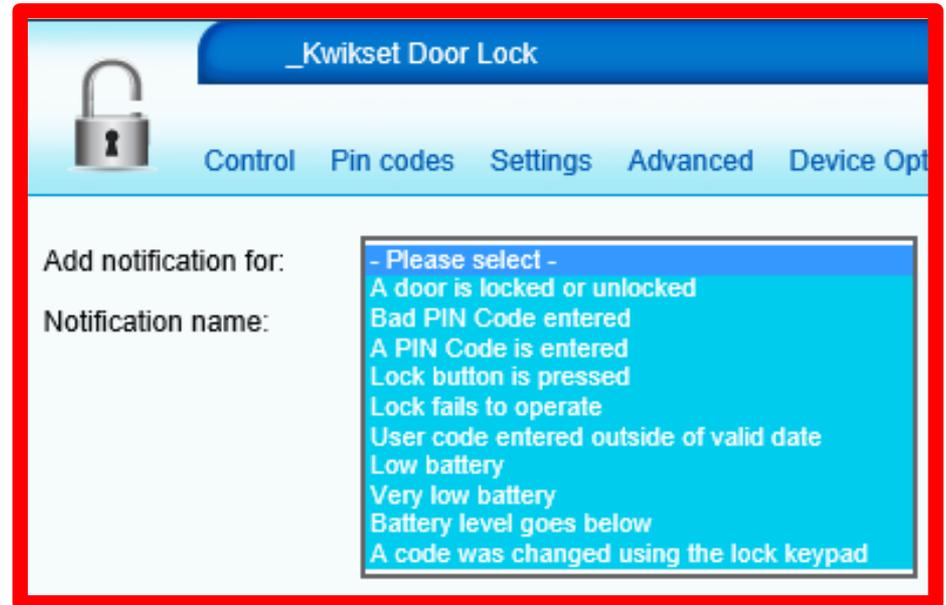


Audit Interfaces

- *Lighting system*: None
- *Scale*: None
- *Lock*: Notifications and access log

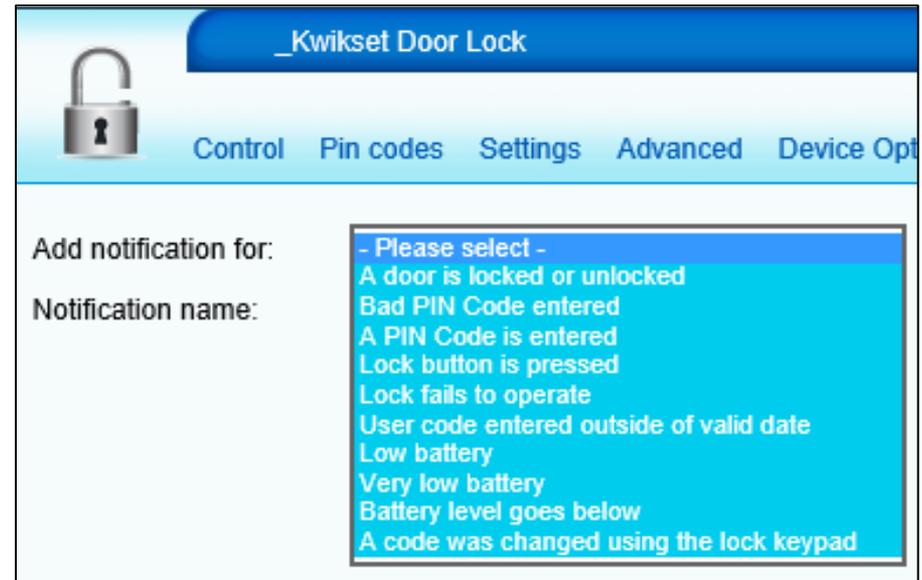
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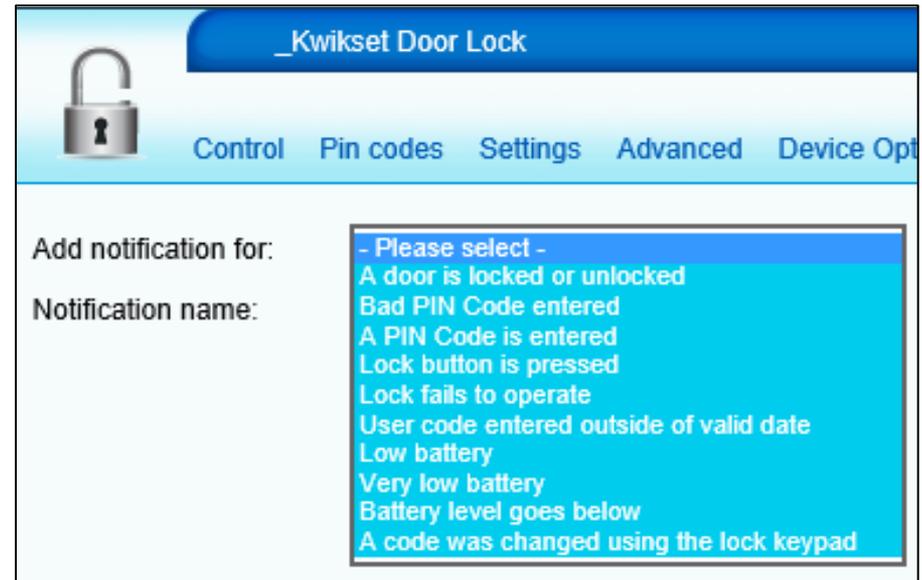
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	Type	Source	Time	Description	Device	Format	
<input type="checkbox"/>				15:27:38	_Kwikset Door Lock	<u>3</u>	
<input type="checkbox"/>				15:24:02	_Kwikset Door Lock	<u>3</u>	
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Conclusions

- Each device confusingly provides different mechanisms and modalities for access control
 - Difficult to share with family, guests
- Audit interfaces sorely lacking
- Each device presents a siloed system
- Opportunities for unified access-control system

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Thank You!

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