The Current State of Access Control for Smart Devices in Homes

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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 <u>OR</u> know account credentials <u>OR</u> 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



Lighting system: None

Log in details	My apps	
My bridge		
Му аррз	Android hue app on motorola DROIDX	DE-ACTIVATE

• Scale: Separate accounts, email sharing

List of accounts with which you share your data:

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

#1 My Numb	er (5446)		Restrict code	Weekly	Remove
Day of week:	Monday	Tuesday	Wednesday	Thursday	Friday
Valid from Valid until	hh v mn v hh v mn v				
Set restriction					

Lighting system: None

My bridge	
Andreid hus ann an matarala DROIDV	
My apps Android hue app on motorola DROIDX	DE-ACTIVATE

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Lighting system: None

Log in details	My apps	
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Scale: Separate accounts, email sharing

List of accounts with which you share your data:

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

#1 My Numb	er (5446)		Restrict code	Weekly	Remove
Day of week:	Monday Saturday	Tuesday	Wednesday	Thursday	Friday
Valid from Valid until					
Set restriction					

X

Lighting system: None

Log in details	My apps	
My bridge		
Му аррз	Android hue app on motorola DROIDX	DE-ACTIVATE

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List of accounts with which you share your data:

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Day of week:	Monday	Tuesday	Wednesday	Thursday	Friday	
Valid from Valid until	hh v mm v hh v mm v					
Set restriction						

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

- *Lighting system*: None
- Scale: None

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Add notifica	 Bad PIN A PIN Co Lock butt Lock fails User cod Low batte Very low Battery le	locked or u Code entere ode is entere ton is presse s to operate le entered of ery battery evel goes be	ed ed ed utside of valid	

• Lock: Notifications and access log

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- Scale: None

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• Lock: Notifications and access log

Туре	Source	Time	Description	Device	Format
f(x)	f(x)	15:27:38	_Kwikset Door Lock	<u>3</u>	🔒 🗙
f(x)	f(x)	15:24:02	_Kwikset Door Lock	<u>3</u>	🔒 🗙
f(x)	f(x)	15:23:47	_Kwikset Door Lock	3	🚊 🗶

- Lighting system: None
- Scale: None

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\ge	f(x)	f(x)	15:23:47	_Kwikset Door Lock	<u>3</u>	<u></u>

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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