Smart Home/Smart Office

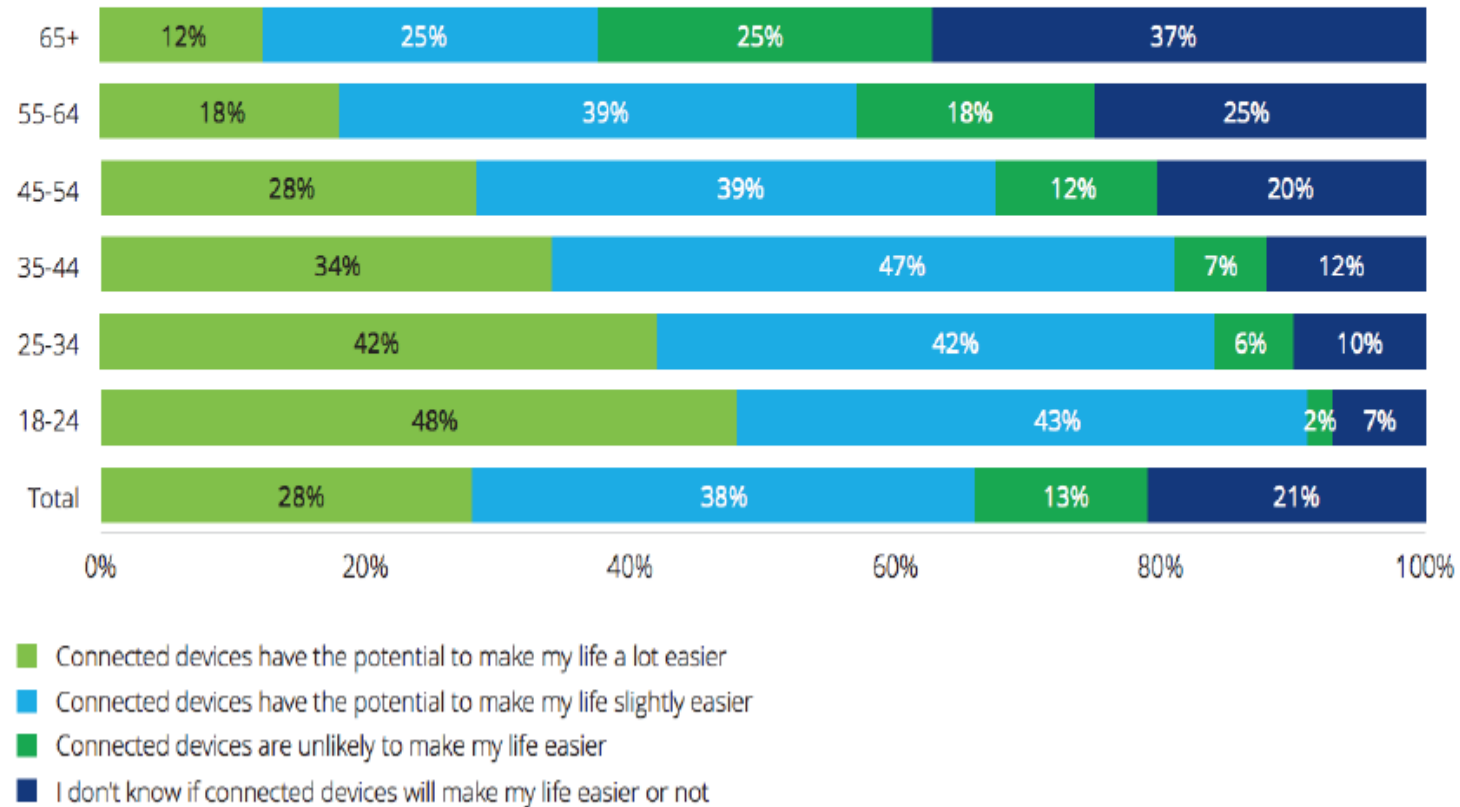**Rob McGuiness**

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State of the industry

- **31%** CAGR 2015-2020

- **$107 billion global market** estimated by **2023**

- Smart lighting household penetration to **double by 2022**

US Smart Homes as a Percent of Total US Households

Year	Percent
2016	12.5%
2017	16.3%
2018	19.6%
2019	22.5%
2020	25.5%
2021	28.0%

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Consumer **Perceptions**

- Homeowners see the industry as **fragmented**

- Interfaces can be **"clunky"**

- Products can be **unreliable** and fail

- Smart home products are **too expensive**

- Lack of **perceived benefit**

Age	Connected devices have the potential to make my life a lot easier	Connected devices have the potential to make my life slightly easier	Connected devices are unlikely to make my life easier	I don't know if connected devices will make my life easier or not
65+	12%	25%	25%	37%
55-64	18%	39%	18%	25%
45-54	28%	39%	12%	20%
35-44	34%	47%	7%	12%
25-34	42%	42%	6%	10%
18-24	48%	43%	2%	7%
Total	28%	38%	13%	21%

Connected devices have the potential to make my life a lot easier
Connected devices have the potential to make my life slightly easier
Connected devices are unlikely to make my life easier
I don't know if connected devices will make my life easier or not

Base: UK consumers 18+ (n = 2076)

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New Construction

Ratio of existing homes sold to new homes sold

9:1

Why are builders adding Smart Home technology?

- Make the existing home **obsolete**

- **Differentiation** within the marketplace

- Cost of technology is easily **rolled into a mortgage**

- Increase **resale value** of the home

- Smart Home Tech's **perceived value** exceeds true cost for homeowner

New Construction Key Consideration:
Does the device perform its core function reliably?

Secondary Considerations:
- What does it work with?
- Will the device integrate with the biggest names in the industry?

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Influencing **Factors**

People want products that...

- Solve **problems**
- Save **energy**
- Are **reliable**
- Are **easy to install and use**

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Product **Categories**

Entertainment

- Speakers, TVs, etc.

Appliances

- Refrigerators, Ovens, Washer/Dryers etc.
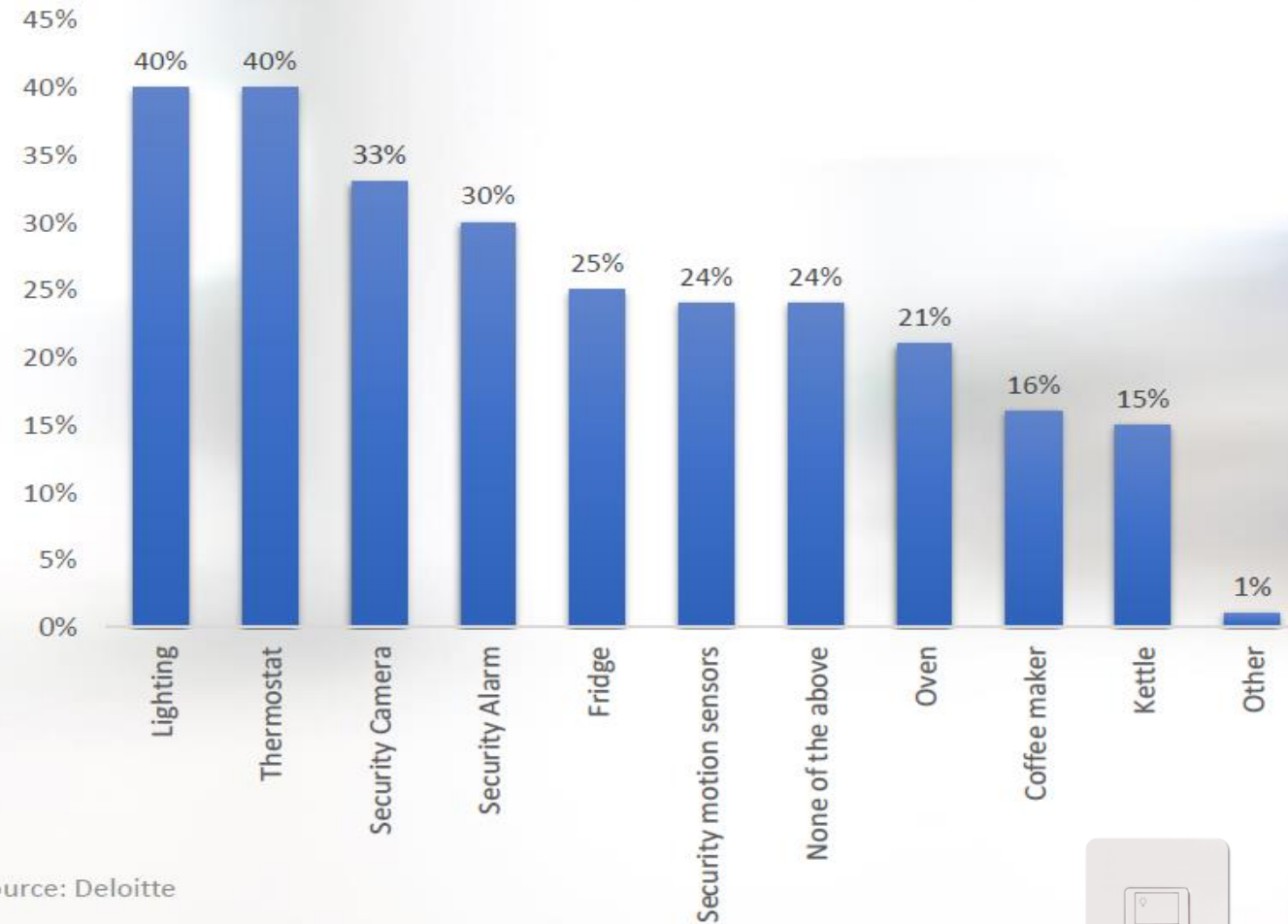
Security

- Door locks, cameras, window sensors

HVAC

- Thermostats, heaters

Lighting

- Dimmers, bulbs, window treatments

Appliances consumers are most likely to replace with a connected device

Bar chart data:
- Lighting: 40%
- Thermostat: 40%
- Security Camera: 33%
- Security Alarm: 30%
- Fridge: 25%
- Security motion sensors: 24%
- None of the above: 24%
- Oven: 21%
- Coffee maker: 16%
- Kettle: 15%
- Other: 1%

Source: Deloitte

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Centralized **System**
overview

Applications

- New construction & major renovation

Configuration

- Panel based

- Device wiring is 'home-run' to panel

Communication

- Low voltage wiring

Centralized **System**
pros & cons

Benefits

Clean aesthetic
- No need to have physical dimmers take up wall space

Devices have few physical limitations
- No need for RF, all metal construction is possible

More flexibility in placing devices
- No need to worry about distance for communication
- Able to communicate over further distances

Instantaneous communication

Limitations

Requires Prewiring
- Limited application for retrofit

- Difficult to add new devices after wiring is setup

Localized **System**
overview

Applications

- Retrofit & new construction

Configuration

- Mix of dimmers, switches, and keypads

Communication

- Typically wireless (RF)

Keypad showing buttons: Welcome, Pathway, Entry, Goodnight, Away

Localized **System**
pros & cons

Benefits

Retrofittable
- Uses existing wiring

Expandable
- Adding additional devices is simple

Limitations

Physical device space
- Wall space needed to house physical dimmers and switches

Device design limitations
- RF requirement leads to certain design limitations

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Hybrid **System**
overview

- **Applications**
  - Typically new construction or expansion of centralized system

- **Configuration**
  - Combination of panels and wireless devices

- **Communication**
  - Wired & Wireless

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Hybrid **System**
pros & cons

Benefits

Flexibility
- Initial setup uses prewiring
- Add wireless devices to system afterwards w/ existing wiring

Limitations

Physical device space
- Wall space needed to house physical dimmers and switches

Device design limitations
- RF requirement leads to certain design limitations

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Lighting control **design**

New construction

- A single keypad can **replace an entire bank of traditional light switches**

- Move all switches & dimmers to **central location**

- Panelized **control**

Retrofit

- Reduce number of gangs required using **hybrid keypads**

- Keypads provide aesthetic enhancement over traditional switches

Relax

Entertain

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Why **Smart Lighting?**

Convenience

- Turn off all the lights with the touch of a button

Aesthetics

- Spotlighting can highlight artwork and décor

- Reduce clutter by replacing switches with keypads

Security

- Automatically turn on all the lights when an alarm is triggered

- Set lights to randomly turn on and off while away to make the home seem occupied

Energy-Savings

- Dimming saves energy and extends bulb life

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Why **Smart Shades?**
accessibility

10-20%

of manual shades are actively controlled

45-75%

of shades do not move at all

Source: UC Berkeley, 2005

Why **Smart Shades?**
automation

- Wake up to **natural daylight**

- Automatically lower at night for **privacy**

- Give the appearance of an **occupied home**

Why **Smart Shades?**
safety & security

- Cordless design, safe for children

- Automatically raise shades when alarm is tripped

- Raise shades when smoke detector is triggered

Why **Smart Shades?**
convenience

- Lower shades for a movie with a **button press**

- Quiet operation and alignment

Smart **Thermostats**

- **Automatically adapts** to owner preferences

- Heats and cools to perfect temperatures **based on usage**

- **Reduces energy consumption** when you leave the house

- **Remotely adjust temperature** for guests and visitors
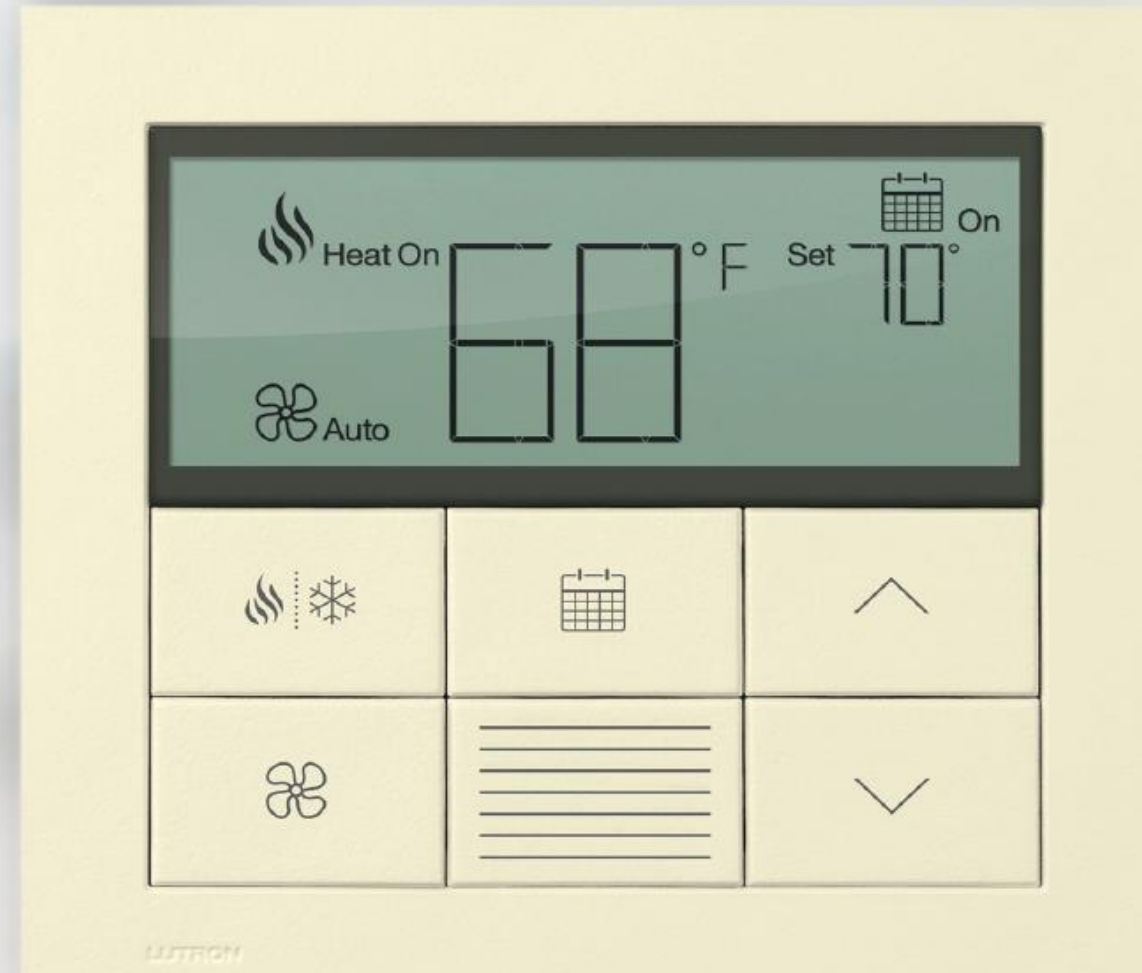
Smart **Speakers**
overview

- **1 in 5** US adults own a smart speaker

- All major smart phones **include voice assistants**

- Voice assistants are being integrated into cars, appliances, offices, etc.

- How to make natural voice commands "I'm leaving" vs "turn on all off"

19.7% of U.S. Adults Use Smart Speakers

Source: Voicebot

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Smart **Speakers**
usage

- Most popular overall uses
  - General questions (60%)
  - Weather (57%)
  - Music (54%)

- Home automation use is increasing (27%)

- Most popular Smart Home uses
  - 1st Lighting
  - 2nd Thermostats
  - 3rd Door Locks

Preferred Smart Home Products for Personal Assistant Control

Among Specified Device Owners or Services Subscribers

■ Ranked 1st   ■ Ranked 2nd/3rd

% Ranking Device/Service at Specified Level
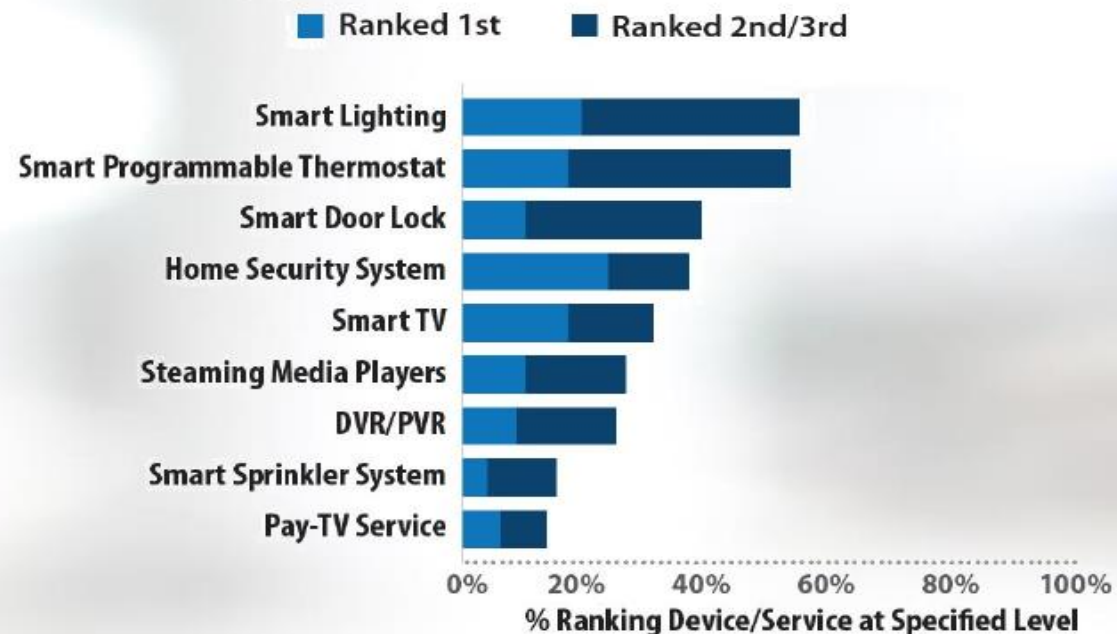
© Parks Associates

Source: Statista, Parks Associates

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Smart **Speakers**
smart home applications

- Voice user interface (VUI) allows for seamless integration across platforms with **one consistent experience**

- Smart speakers can pull in names for scenes and actions from smart home products **without much additional setup required**
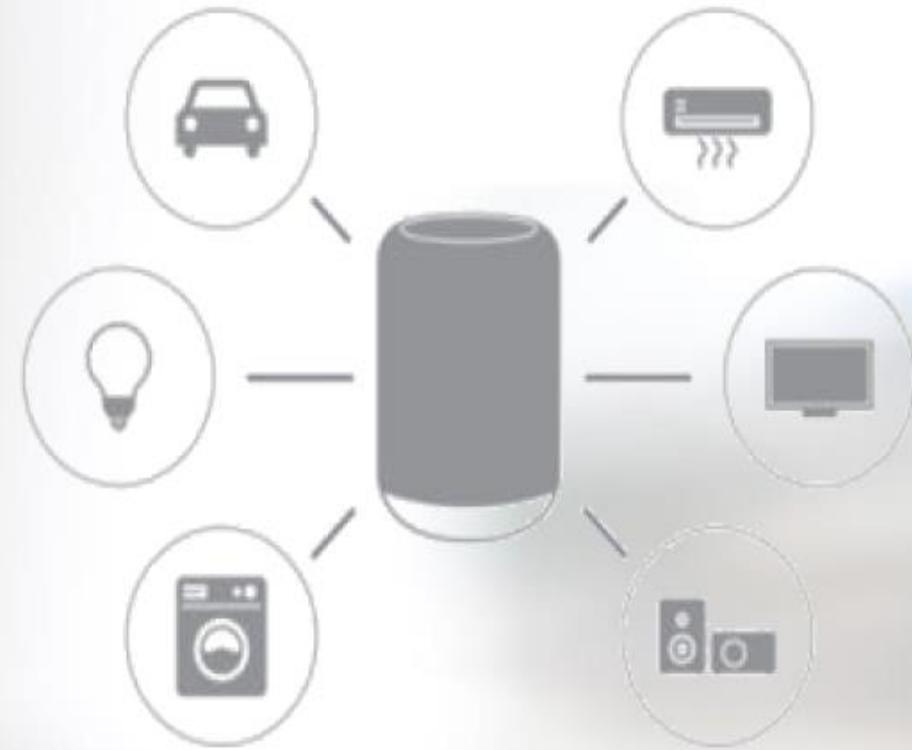
Smart **Speakers**
smart home applications

- Using one voice command, a homeowner can initiate a **sequence of events**

"I'm Leaving!"

| **turns off** the lights and tv

| **closes** the shades

| **lowers** the temperature

| **activates** an alarm system

| **locks** the door

Integration

For the promise of the Smart Home to become a reality, products need to work together and **create seamless experience.**

Integration
evaluation **criteria**

Interference with/from other networks

- Does the technology require a site survey?

- Are you restricted from adding other equipment (routers, Bluetooth devices, etc.)?

Frequency

- Higher frequency: more attenuation and bandwith competition
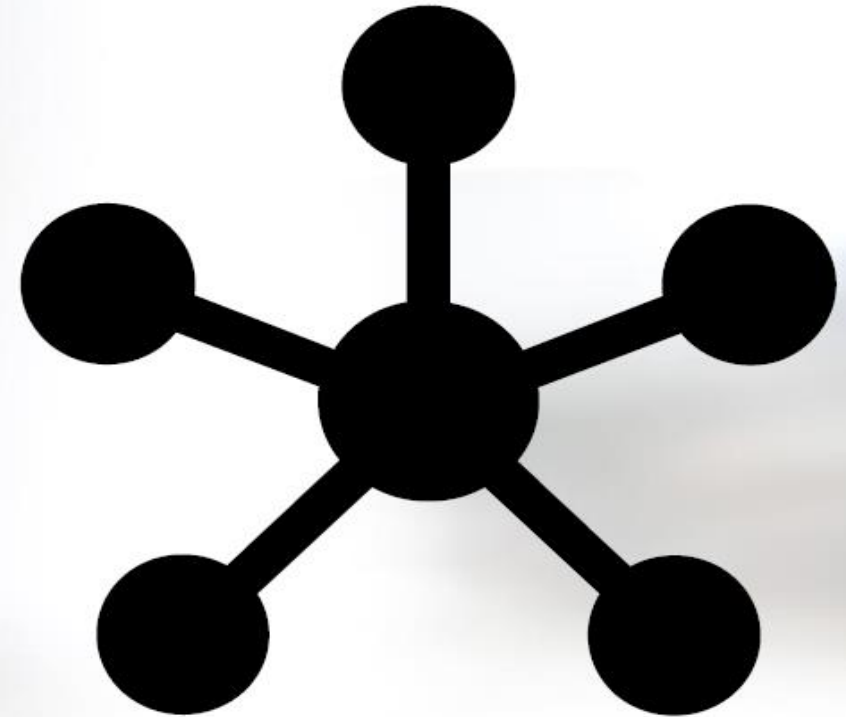
- Lower frequency: only communicates when needed

Range

- Look out for "works up to..."

FCC regulations

- Power

- Duty cycle

Fixed vs. mesh network

Local **Integration**
benefits and limitations

Benefits

- Does **not require** on internet connection

- Fewer communication delays

Limitations

- More **limited capabilities** than cloud-based integration

- More complicated remote access setup

Cloud Integration
overview

Integrating companies have internet-connected servers in **different physical locations**

Cloud **Integration**
benefits

- Increased **security** (requires inside-out connection)

- **Reduces physical space** needed in devices

- Additional **functionality** (voice control, geofencing, remote access)

- **Serviceability** is easier (automatic updates)

Security
overview

In order to make a smart home as secure as possible:

- **Create strong passwords** for devices and logins

- **Enable two-factor authentication** when possible

- **Keep firmware updated** to the latest version

Lutron Caseta

- Total home control for spaces up to 3,500 sq feet
- 75 device limit with smart bridge
- Lutron's patented Clear Connect technology
- Pair any dimmer, switch, lamp dimmer, fan control or outdoor smart plug with a pico
- Most connected smart home product in mid-mass market.

Provides many ways to control your lights!

Dimmer	**Pico Remote**	**Slider**
Scenes	**Scheduling**	**Geofencing**
Sensor	**Wearables**	**Voice Control**

Wear OS by Google

Works with Apple HomeKit

WORKS WITH amazon alexa

works with the Google Assistant

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Thank You
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