



HOME AUTOMATION

An Introduction

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HOME AUTOMATION

What is Home Automation?

- Home automation refers to the automatic and electronic control of household features, activities, and appliances (IoT)

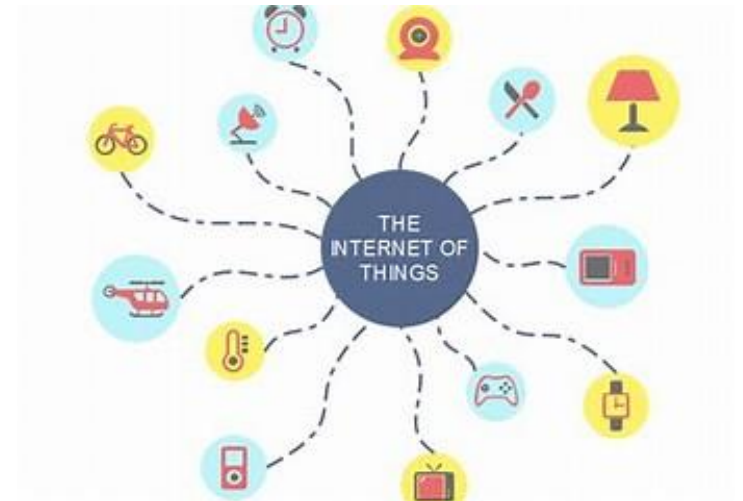
What is Required?

- Internet Connection
- Wi-Fi Router
- Smartphone or tablet (Android or iOS)
- Connectable appliances and devices
- Voice operated Controller or Host (optional)

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The Internet of Things (IoT)

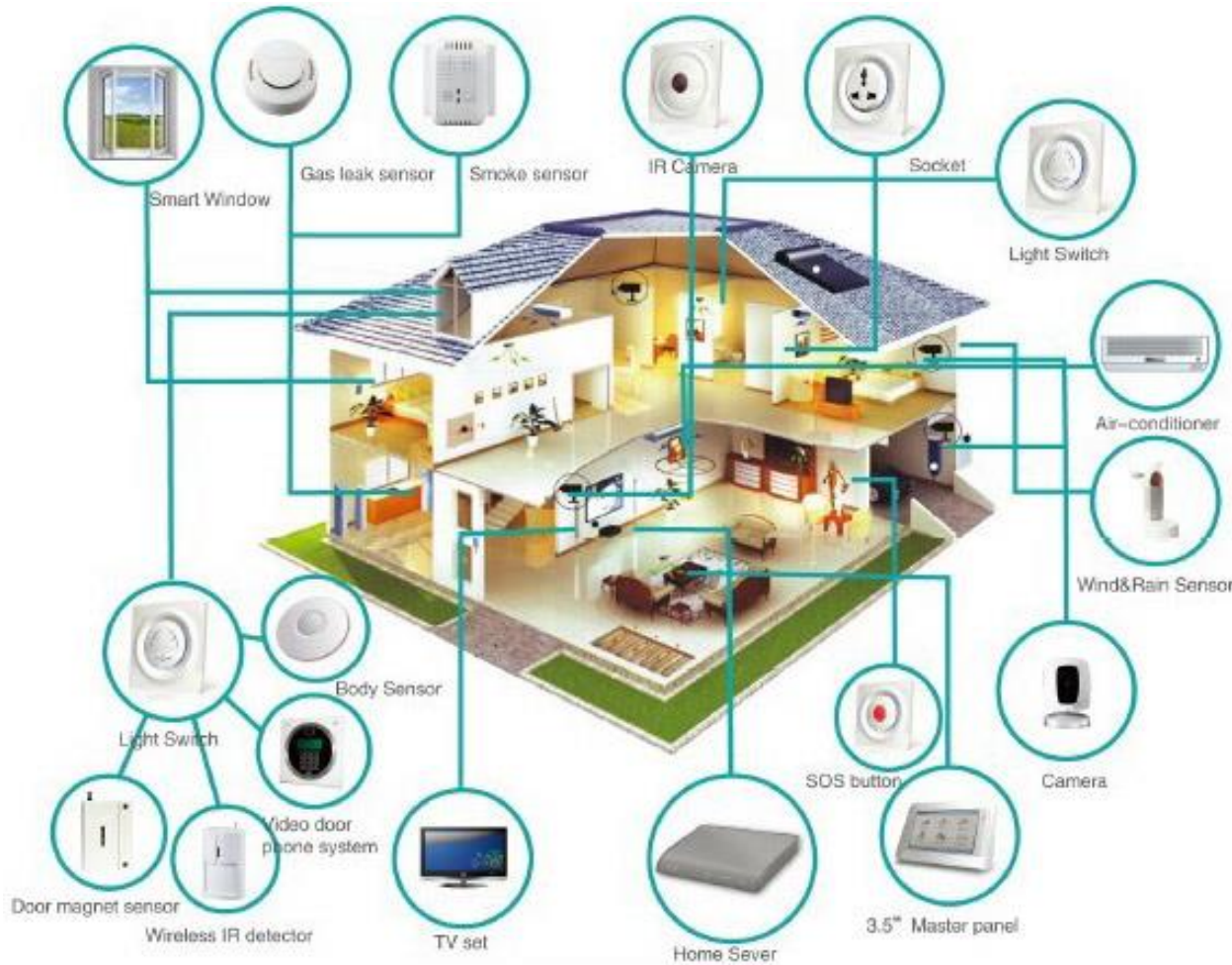
- The concept of basically connecting any device with an on and off switch to the Internet (and/or to each other).
- The IoT is a giant network of connected "things" (which also includes people).
- “Connected People” with Embedded devices for monitoring and analysis for wellness care and Telemedicine.



IOT DEVICES

There are many different devices (IoT) that make up today's Home Automation.

- Door locks
- Doorbells
- Garage door openers
- Thermostats
- Speakers
- Personal assistants
- Refrigerators
- Crock pots
- Robots
- Vacuum cleaners
- Baby monitors
- Security systems
- Plugs and switches



A good beginning is with a light starter kit.

HOME AUTOMATION DEVICES

Two Approaches – Device Approach or System Approach

Device Approach

May or may not involve internet

- Not manufacturer specific
- Can be a mix of Zigbee, Z-Wave, Insteon protocols or WeMo Devices
- Other options include Bluetooth, IR, or proprietary devices
- Personal assistants, like Alexa or Google Home, can be involved
- There are many different IoT devices that make up today's smart home

HOME AUTOMATION DEVICES

System Approach

- Involves the use of internet and a Wi-Fi connection
- Typically involve the use of a 'hub'
- Smart devices can be connected through the hub
- It can be manufacture specific
- Personal assistants, like Alexa, Google Home, etc. are often included.
- Protocols: Zigbee, Z-Wave, Insteon, WeMo, & Bluetooth.
 - Proprietary: Audio iOS for HomePod and X10 (RF)

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Reasons for Home Automation

- Convenient control of many devices
- Security
- Energy Savings
 - Low wattage devices
 - Controlled on demand
 - Controlled remotely

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Commercial Home Automation & Security Systems

- ADT
- Vivent Smart Home
- Cox Home

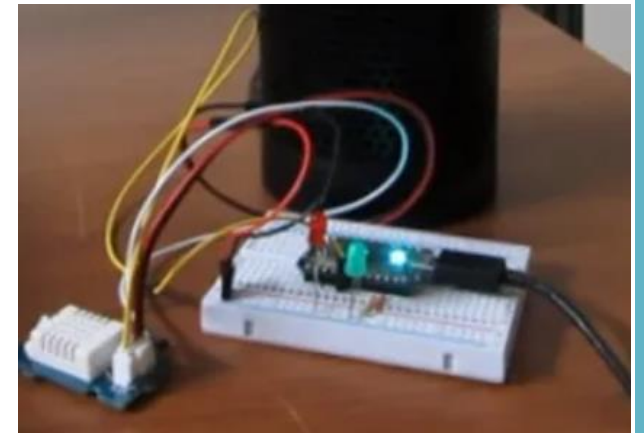
Commercial Offerings Costs

- Installation
- Monthly Fees
- Equipment
- Activation

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Do It Yourself (DIY)

- Devices cost but you can monitor free
- Plug and Play (maybe)
- Devices
 - Mostly not integrated (standalone)
 - Require multiple apps to control everything



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Standalones

- These devices can be installed and controlled independently with a smartphone or tablet through Wi-Fi
 - Thermostats
 - Lighting devices
 - Doorbells
 - Door locks
 - Wi-Fi smart plugs (WeMo)
 - Household appliances



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X10 Networking

- X10 has been in the business of Home Automation since 1978
- The X10 and X10 Pro product lines are the original home automation source for end-users, installers, contractors and the do-it-yourself market
- Offers a wide array of automated and security gadgets to DIY consumers.

HOME AUTOMATION

- Can control all your X10 products from your Apple or Android smart device anywhere you have internet access using the X10 Wi-Fi Unit
- X10 and X10 Pro have stood the test of time.
- Reliability and ease of use are the primary reasons these product lines have been going strong for over 40 years.
- Proprietary - <https://www.x10.com/>



HUBS

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What are Hubs?

- Smart home automation hubs are a one-stop solution for unifying your connected gadgets
- Allows controlling them from one simple app on your smartphone or tablet
- Support different connectivity protocols: Zigbee, Z-Wave, Bluetooth, etc., for example.
- Support for IFTTT (If This Then That) to configure and trigger your connected devices

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Types of hubs or controllers

- Hubs (controlling multiple devices)
 - Samsung Smart Things or
 - Logitech Harmony
- Supplied controller (i.e. Hue Hub)
- Speakers (Voice Recognition)
 - Google Home or
 - Amazon Echo, Dot or
- Hybrid – Amazon Echo Plus
- Cost - \$50 to \$200



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 Share

Apple HomePod

Apple Home Pod

- Runs an operating system known as "audioOS" an iOS-based OS which is specifically designed for the HomePod
- It integrates Siri, which can be used to control the speaker and other HomeKit devices
- The HomePod supports only proprietary Apple platforms and technologies. -- Cost \$350

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Microsoft Cortana

- Windows 10 Cortana is Microsoft's virtual assistant that can help you connect and operate your electronic devices.
- Manage Skills found in the Cortana Notebook allows you to connect with many of the popular
- Cortana to manage these devices for you using your voice command. For instance, when you say, 'Cortana, turn on the air conditioning.' Cortana will do it for you.
- Cost: Free

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What can a Hub do?

- Turn on your lights and other connected devices from one app.
- Serves as Master Controller

What can Smart Speakers do?

Interact with other Devices

- Daily Reminders
- Interact with your daily calendar
- Find locations of businesses
- Tell the weather and news
- Customize tasks with IFTTT (If This Then That)



STARTER IDEAS

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How to Get Started

- Make a plan
- Decide what you would like to automate
- Keep it simple
- DIY – Do it yourself

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Wemo Mini Smart Plug

- PEACE OF MIND WITH REMOTE CONTROL
- When a light or appliance is plugged into a Wemo Mini Smart Plug, you can turn it off from your phone or tablet no matter where you are.
- You'll never have to worry that you accidentally left the iron on or coming home to a dark house again.



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Control Your Home From Anywhere

- The Wemo Mini Smart Plug lets you control your electronic devices right from your phone or tablet.
- The Smart Plug uses your existing home Wi-Fi network to provide wireless control of lamps, heaters, fans, and more--with no subscription or hub required.
- Simply plug the Wemo Mini Smart Plug into an electrical outlet, plug a device into the Smart Plug, and control your device using the free Wemo app.

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Google Home-Mini and GE C-Life Bulb Combo

- Easy, seamless set up, just plug in Google Home Mini, screw in the GE c-life light Bulb, and download the Google home app
- Set the mood, dim the lights for a family movie night without leaving the couch
- Say goodnight – create a routine so you can turn off the lights while staying cozy
- Expandable.



Found at Best Buy, Lowes, Home Depot for about \$35.00.

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- The X10 Wireless Starter Kit (RF) comes with everything you need to get started using X10 for wireless Home Automation.
- It comes with a Keychain Remote, TM751 Transceiver and a AM466 Appliance Module.
- Simply plug in the transceiver, plug in Lights or an Appliance into the AM466 and plug it into the wall and you are up and running in seconds!

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- You can also plug in a unit to the bottom of the transceiver for ON and OFF operations.
- In essence, giving you two addresses to control with your KR19A
- About \$35.00 on X10 website - <https://www.x10.com/kitwirelesskr19a.html>





SECURITY

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VULNERABLE DEVICES



Most IoT malware targets non-PC embedded devices.



Many are Internet Accessible.



Lack of an OS and processing power limitations, do not include advance security features.



Designed to be plugged in and forgotten after basic setup process.

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Precautions

- Using the same password for a shopping site account and the site is breached, your login information could end up in the wrong hands
- People with access to your credentials can cause the kind of issues
- Enable 2-step verification
- Choose strong passwords
- Check whether or not your email address and password have been breached using this website:
<https://haveibeenpwned.com/Passwords>

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Precautions

- Protect your home network
- Keep your home network router software up to date
- Set up and use a guest network if your Wi-Fi router supports it

ROUTERS “THE KEY” TO SECURITY

- Most IoT devices connect to the Internet through ‘Wi-Fi’ or ‘wired’ connection via a router
- Routers have ‘built-in firewalls to minimize intrusion
- A router determines where to send information from one computer to another

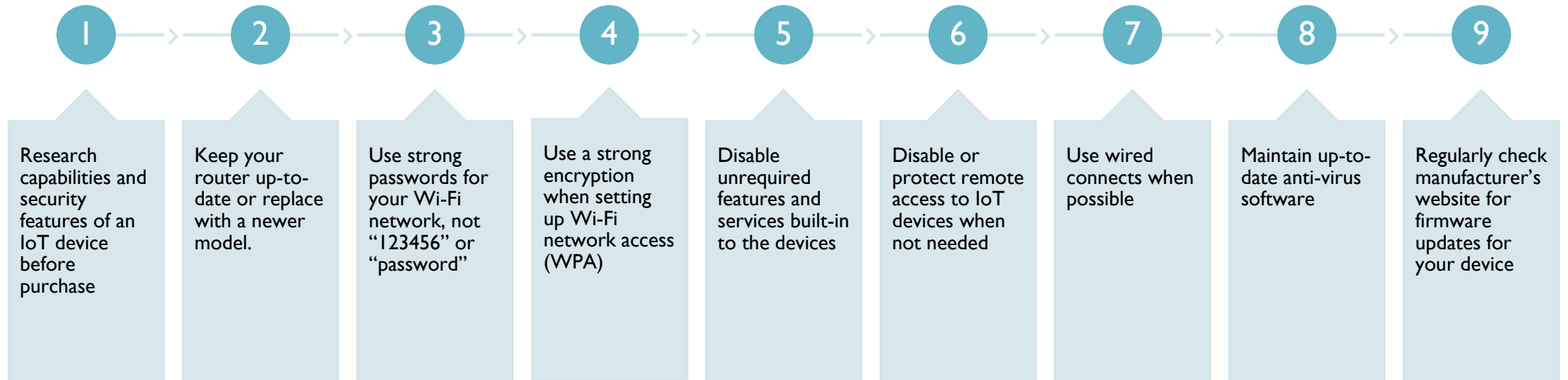
ROUTERS “THE KEY” TO SECURITY

- A router has three separate, but related jobs:
 - It ensures that information doesn't go where it's not needed
 - It makes sure that information securely makes it to the intended destination
 - Wraps data in a secure envelope (encryption) for outbound traffic

PRIVACY

- If there's a depressing slogan for the early era of the commercial internet, it's this: "Privacy is dead – get over it."
- If privacy isn't dead yet, then billions-upon billions of chips, sensors, and wearables will seal the deal
- Most IoT devices require location services turned on and to be functional are in listening mode 24/7
- Be forewarned, IoT is about more than just internet-connected refrigerators.
- It also represents a move to have even more objects networked and embedded

STAYING PROTECTED





CHIP - PROJECT CONNECT HOME ON IP

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PROJECT CONNECTED HOME OVER IP (CHIP)

- New Industry Group announced by Apple, Google, Amazon and the ZigBee Alliance, announced in December 2019.
- The World Today: Half a dozen incompatible Standards:
 - If you are out shopping for smart home products, you will have an endless sea of choices.
 - Just settling on smart bulbs presents more decisions and more questions, should you get Wi-Fi, Z-wave, or ZigBee bulb?
 - Unfortunately, these standards do not work together.

PROJECT CONNECTED HOME OVER IP (CHIP)

- Require a hub to play with others.
- Each standard comes with its vulnerabilities and defects.
- Network created a dozen different ways leaves you with a dozen of cracks that threaten to bring your system down.

CHIP WON'T REPLACE YOUR INTERFACE

- CHIP has two goals
 - Make manufacturing secure and cross-compatible smart devices easier.
 - Make smart devices more accessible to consumers.
- Works in the Background
 - You won't pay attention to how your smart lock communicates with your smart blinds.
 - If you use Google Home or Alexa to control your devices, you can continue to do so.
 - CHIP enabled devices will not break your current devices.

EASIER SET-UP TO GET GOING

- If smart homes are going to become common place and mainstream, this needs to happen:
 - They need to be easy to set up and use
 - Skip using a hub and go straight to device set-up
 - Plug and Play - open an app, plug in the gadget and then pair
 - If you rely on voice controls, you may never need to open the device app again.

EASIER SET-UP TO GET GOING

- Connection of dozens of Wi-Fi Smart gadgets that won't slow your network, because they are not constantly communicating.
- Wi-Fi Smart Devices need to connect directly to the main router.
- Wi-Fi performance needs to improve from using 2.4 GHz to 5 GHz.

EASIER SET-UP AND GET GOING

- According to their website, the Working Group has a goal to release a draft specification in late 2020. Actual products that support the CHIP/Thread connectivity standard will arrive later.
- Very early stages of development
- Lofty goals, smaller groups have tried to accomplish this goal without much traction. If the smart home titans, Phillips Hue, Google and Amazon can work together. This could make the standard come together faster and accessible to everyone.



WI-FI – A POTENTIAL SOLUTION

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WI-FI ISN'T A STANDARD

- Anyone knowledgeable in the Smart Home realm will point out the differences between Z-Wave, ZigBee and Insteon vs. Wi-Fi.
- Z-Wave, ZigBee and Insteon are standards with agreed-upon conventions for implementation.
- Wi-Fi in the smart home realm is not a standard.
- Thread and CHIP are changing that. Sharing a basic idea in common, connection over IP.
- IP is not the same thing as Wi-Fi, but if Thread or CHIP is adopted, Wi-Fi can conform to those standards.

WI-FI - A POTENTIAL SOLUTION

- For the average users, Wi-Fi will present a potential solution to many of the smart home frustrations:
 - Eliminates the need to learn and relearn how to connect and use things
 - Make more people comfortable with the thought of installing smart home devices, which could lead to more sales
 - Allowing Wi-Fi devices to stand on their own without the need for hubs or voice assistants.

HOME AUTOMATION QUESTIONS

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