

Smart Devices

Mendlesham Computer Club

By Giles Godart-Brown

What are Smart Devices?

Smart Devices access the internet to enable remote services, monitoring and management of systems and appliances.

- Convenience
- Security
- Efficiency
- Comfort

There are lots of Smart Devices on the market

- Smart Thermostats (e.g., Nest, Hive, Ecobee)
- Smart Lights (e.g., Philips Hue)
- Smart Security (cameras, doorbells like Ring)
- Smart Plugs & Appliances
- Smart Speakers (e.g., Amazon Alexa, Google Assistant)
- Smart Meters

What technologies are involved?

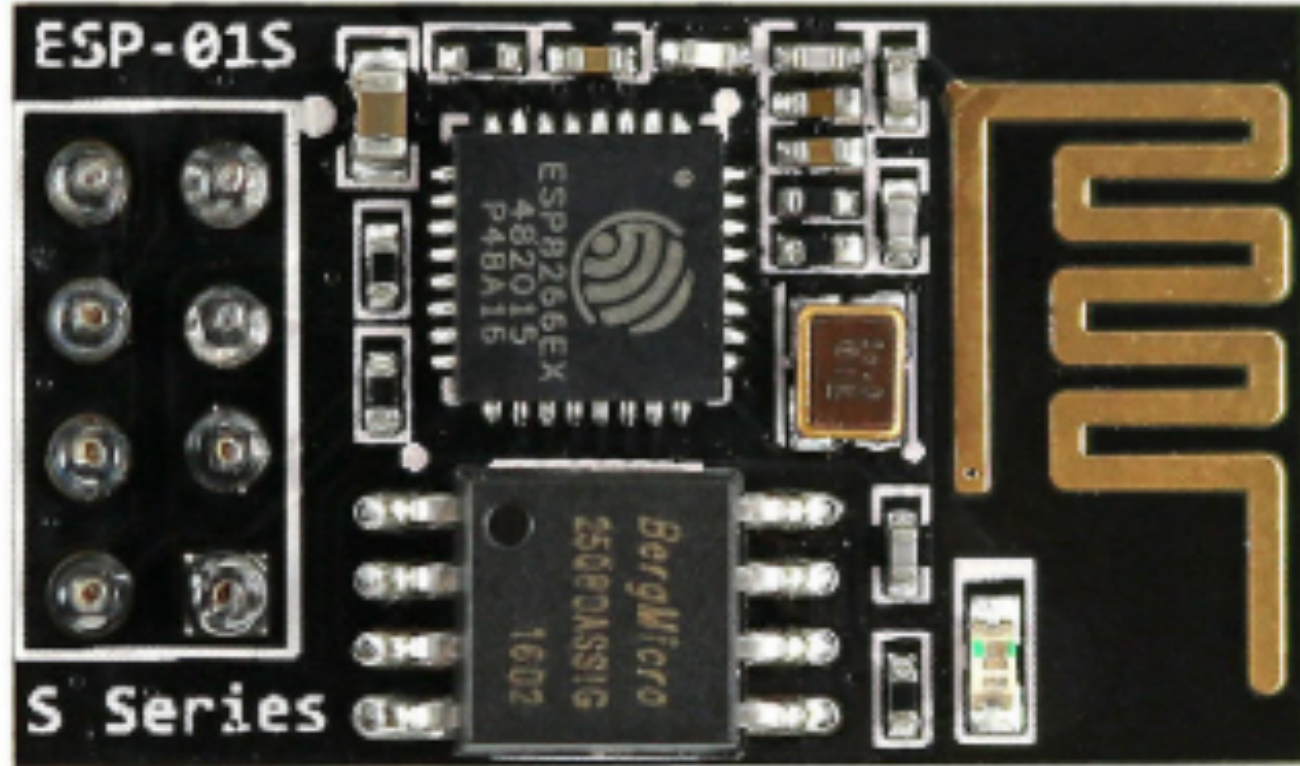
Smart Devices (sensors, lights, thermostats, cameras) use the following technologies

- The Internet of Things (IoT)
- Wireless technologies (WiFi, Zigbee, Z-wave)
- Central hubs and/or apps for control (e.g., Smart Speaker, Phone, Tablet, PC, Raspberry Pi with Home Assistant)
- Cloud-based apps (e.g. Tuya)

The Internet of Things

IoT

The IoT was largely enabled by the ESP8266 processor



Which wireless?

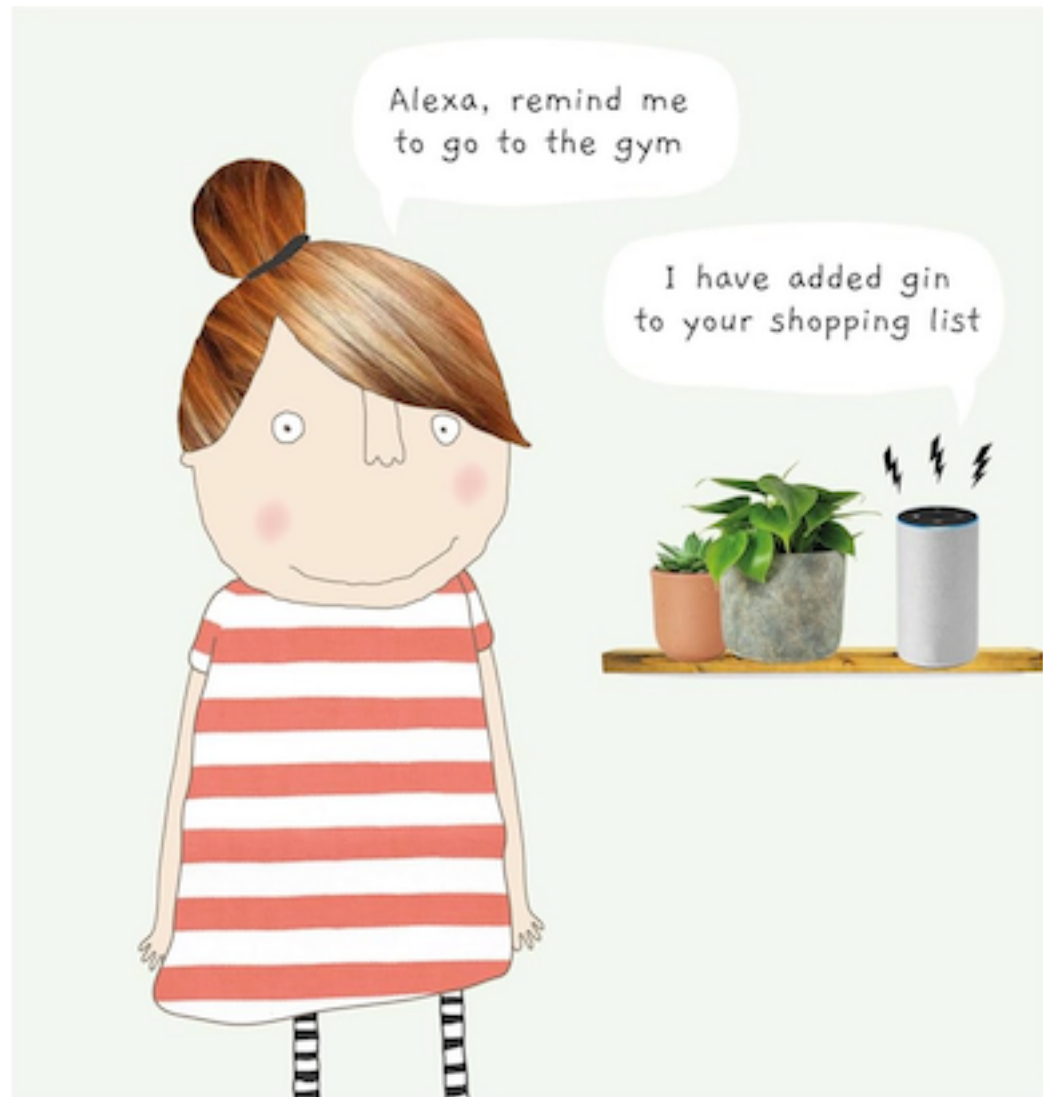
IoT uses several wireless technologies

- Wifi is used for mains powered devices, but it uses a lot of power so cannot be used for battery devices
- Zigbee and Z-wave are used for battery powered devices, but they need a gateway to connect to wifi.
- Bluetooth is sometimes used for setting up devices. It has a much shorter range than Zigbee/Z-wave.

Smart Speakers

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What is a Smart Speaker used for?

A Smart Speaker allows you to use voice commands for the following activities;

- Time management (alarms, timers, reminders, calendar)
- Audio entertainment (stream music, radio, podcasts, jokes, games)
- Getting Information (news, weather, calendar, Q&A)
- Telephony (hands free calling over the internet)
- Shopping (particularly with Amazon Alexa)
- Home automation (control lights, locks, thermostats)

Who makes Smart speakers?

- Amazon - Alexa based devices e.g. Echo
- Google - Home
- Apple - HomeKit
- Samsung - SmartThings

The market is dominated by Apple with Google a distant second.

Alexa demo

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Smart home demo based on Alexa

- Entertainment - radio podcast
- Time management - timers, reminders, alarms and calendar
- Information - News and weather
- Telephony
- Simple Smart Switches

Smart Metering

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What does a Smart Meter do?

- A Smart Meter records your consumption of electricity, gas, or water in real time and sends the usage data automatically to the utility provider.
- The law requires all old analogue meters to have been replaced by Smart Meters.

How do they work?

- They send usage information to the utility provider usually via the mobile phone network.
- They also receive data from the network provider or rates, off-peak times etc.
- In places of poor mobile coverage, extra boosters are being installed at the top of high poles fitted with a solar panel e.g. at the entrance to Mayfield Way
- They have a display device in the house showing consumption not only in units but also in £.



Privacy

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Privacy and smart devices

- There are some concerns about the privacy of the data that Smart Devices collect and that somehow they are being monitored and controlled by bad people.
- There is no evidence of this being the case, however if you are concerned then one can set up a private network inside your firewall that is only used for Smart Home and not accessible from the public network.
- Always use strong passwords when setting up devices.
- Zigbee and Z-wave devices are secure by the nature of their short range and strongly encrypted traffic.

Privacy and smart speakers - Alexa

- There is no evidence from measuring the network traffic that Alexa records all of the time.
- Alexa only records what you say, starting from a few seconds before the wake word was detected until your request is completed.
- Because it is always waiting for the wake word, Alexa can sometimes mishear background noise or similar-sounding words (a false trigger) and begin recording.
- Depending on your security settings, devices may also record short clips when they hear specific sounds like breaking glass, smoke alarms, or a dog barking.

Privacy and doorbell cameras

If your doorbell camera records outside the boundary of your property such as the street or neighbouring homes or gardens, then you have responsibilities under the General Data Protection Regulations (GDPR).

- You must place clear, visible signs (e.g., "CCTV in operation") around your property.
- Adjust your camera's motion zones and field of view so it does not overlook private areas e.g. directly into a neighbour's window.
- You are legally obliged to provide individuals with a copy of their recorded footage or audio within a reasonable timeframe (typically 30 days).
- Ensure your app or storage system has strong password protection and encryption. Set your device to automatically delete or overwrite older footage (usually between 14 to 31 days) unless it is being saved for an active police investigation.