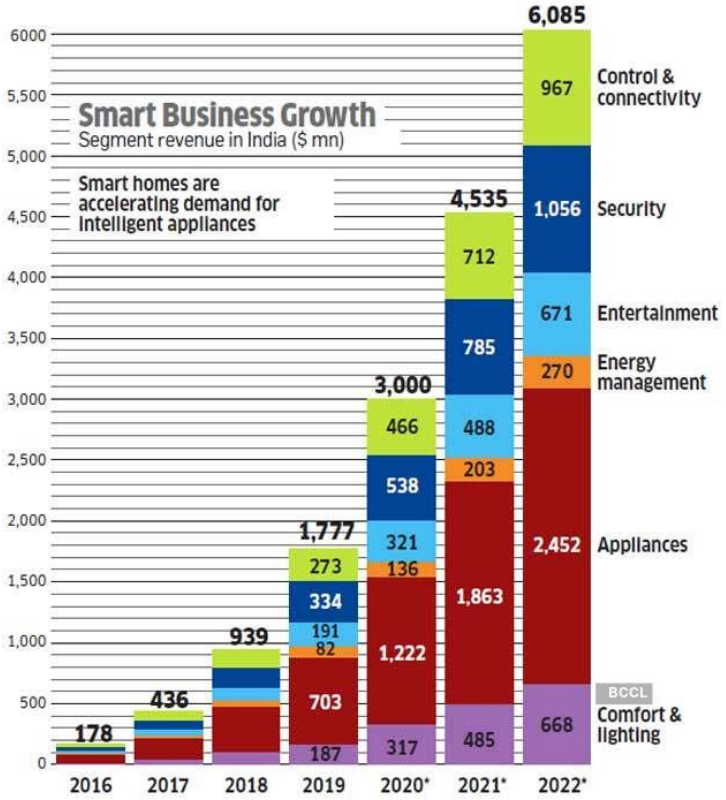
Smart Home Overview

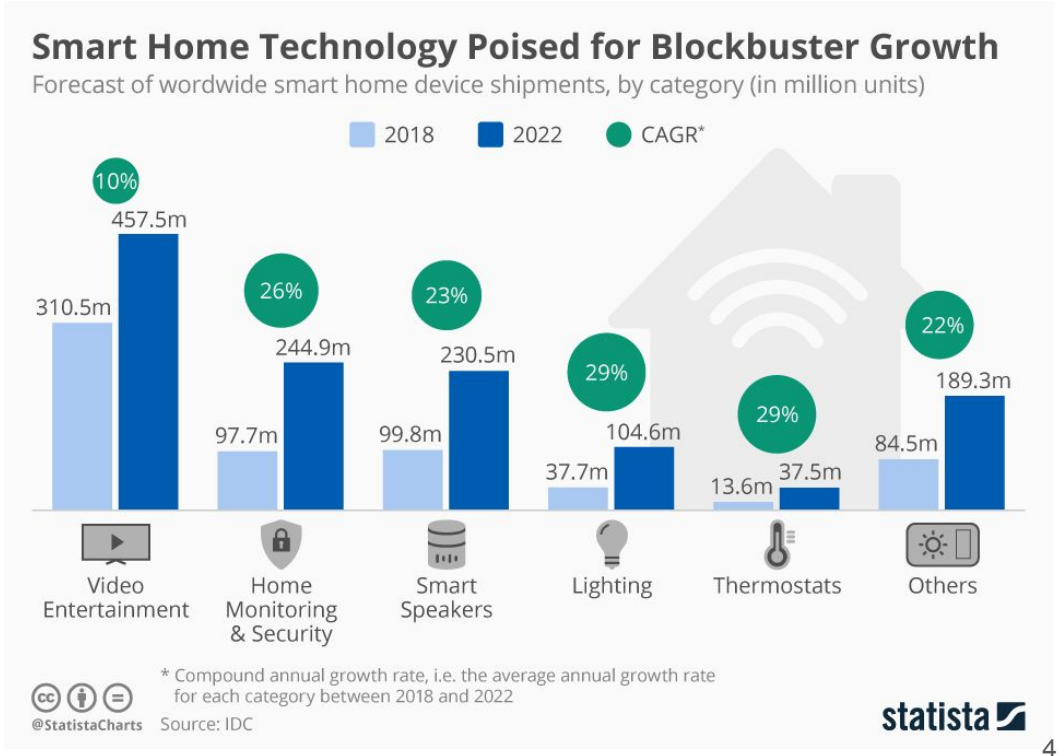
October 2021

Summary

Market Size

Smart Home Market Size





The Problems

X10 - The Original Home Automation Protocol

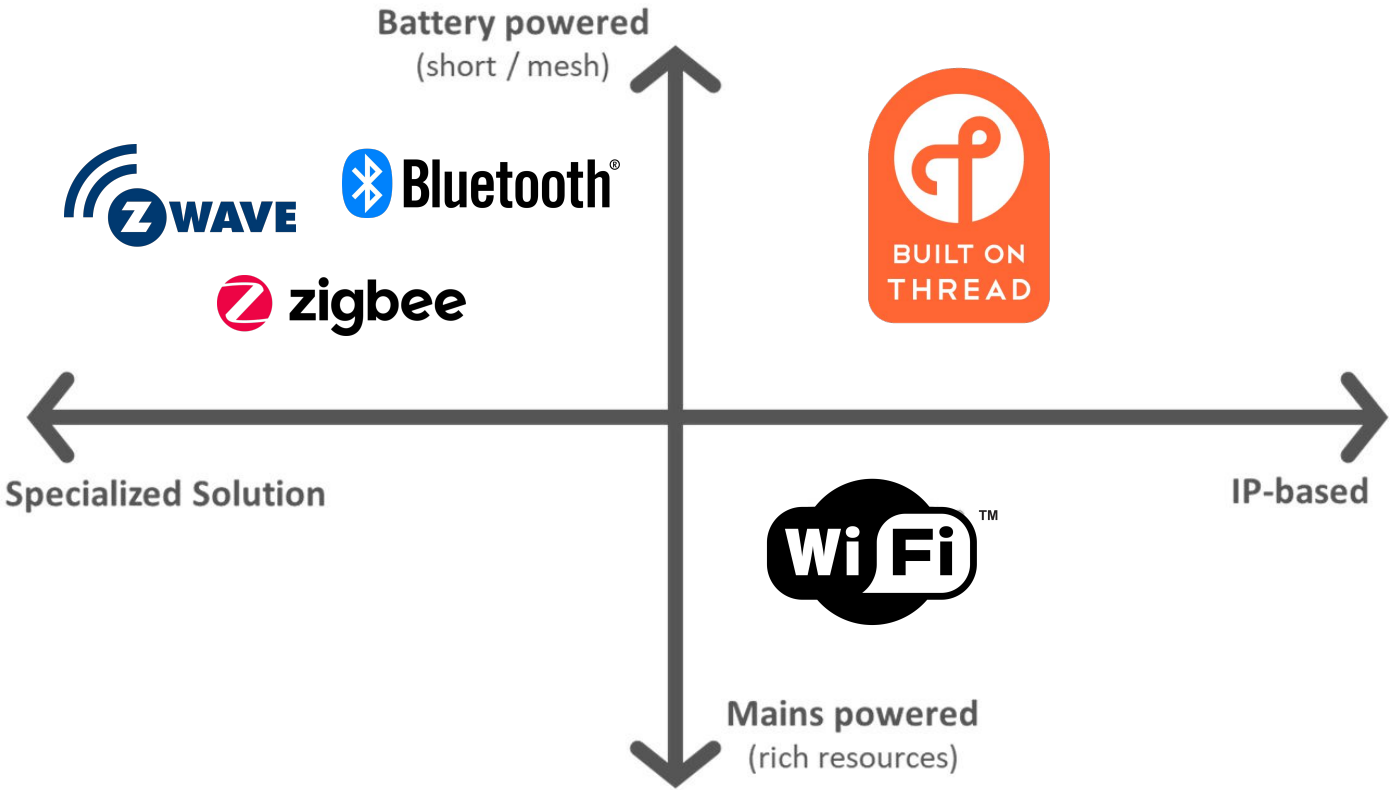
X10 was one of the first home automation protocols that started in 1975.

Since then many have come and gone.

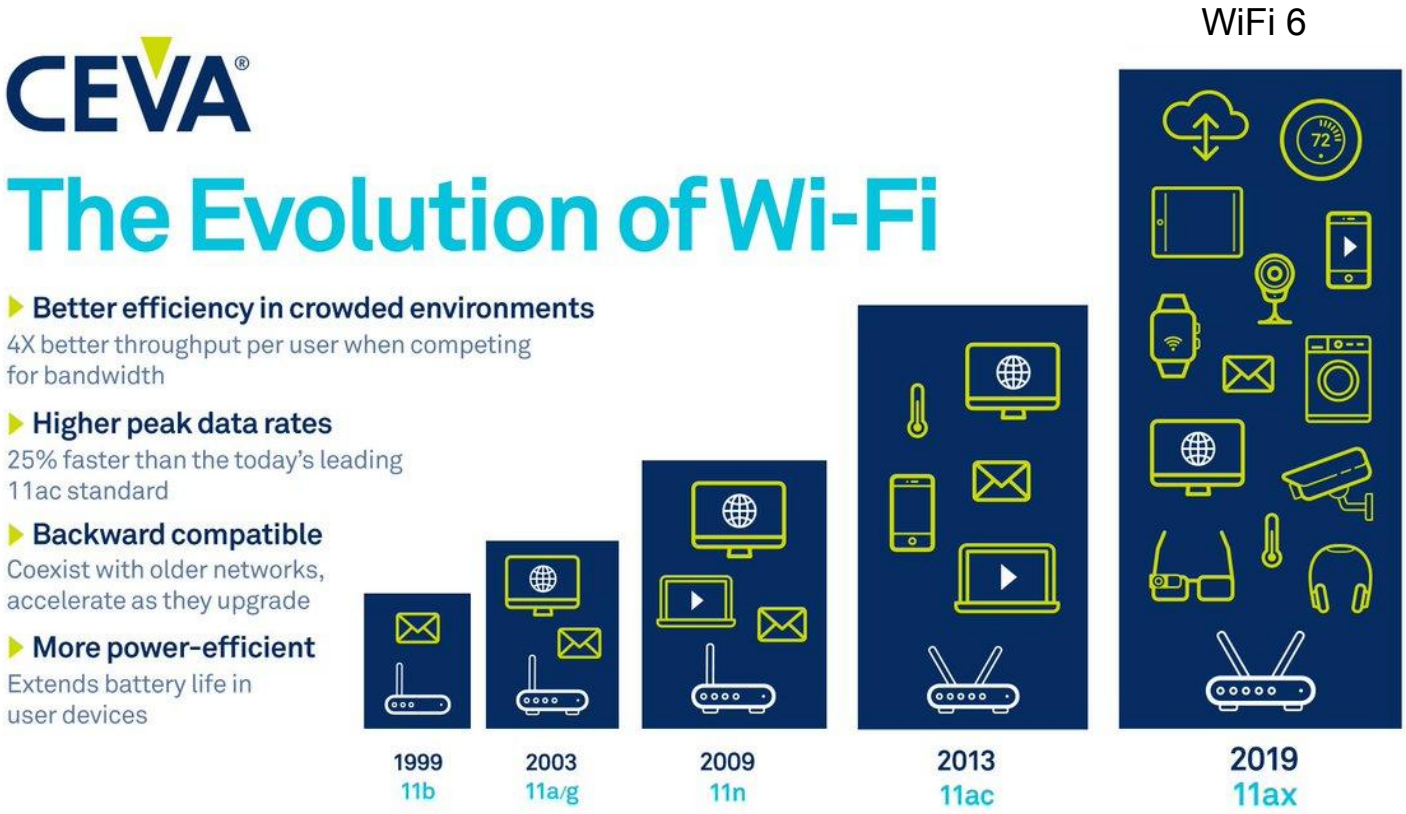
Customer Confusion

The consumer is confused by the various products that don't work with each other. A customer does not care about Zigbee or "works with XYZ"...it should just work. Look at WiFi, when a customer buys a WiFi router they know it will work with their phones and laptops.

Various Communications Protocols



Evolution of WiFi



WiFi vs. Zigbee

Based on IEEE 802.11 series of standards. The standards include 802.11a, 11b, 11g, 11n, 11ac, 11ad, 11ah and so on. This is what most consumers know and use.

Based on IEEE 802.15.4 standard. Zigbee is ideal for low data rate home automation applications mainly for smart home applications.

Not All Routers Are The Same

Most routers only include WiFi support. Which means that a Zigbee hub would have to be bought as well. The Zigbee hub provides a bridge between Zigbee devices and the WiFi network. Consumer chaos ensues.

SmartThings Zigbee Hub

Software Ecosystems

Even if all your devices were connected using WiFi, there is now the issue of multiple ecosystems that don't talk to each other.

Google Home

amazon echo

Same WiFi Standard, But Not Compatible

Wemo Mini Smart Plug

It's WiFi enabled but will only work with the Apple HomeKit ecosystem

Crompton Smart Plug

It's WiFi enabled but will NOT work with the Apple HomeKit ecosystem

amazon alexa

Works with Apple HomeKit

works with the Google Assistant

The Solution

Thread and Matter

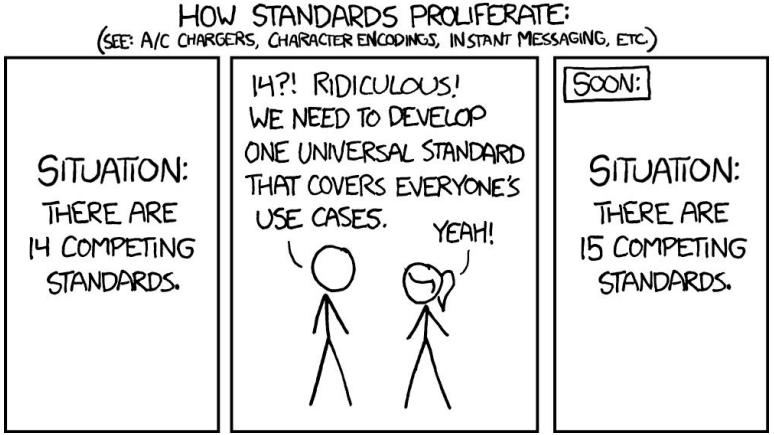
Thread is the communications layer protocol which will replace Zigbee and Z-Wave.

matter

Matter is the application layer protocol that will replace all the proprietary ecosystems like Amazon, Apple, Google, etc...

Why Thread and Matter?

The 3 big industry players (Amazon, Apple and Google) have realized they can sell more products if they work together on a common standard. The previous attempts for a standard didn't have all the major players onboard. This time around they do.

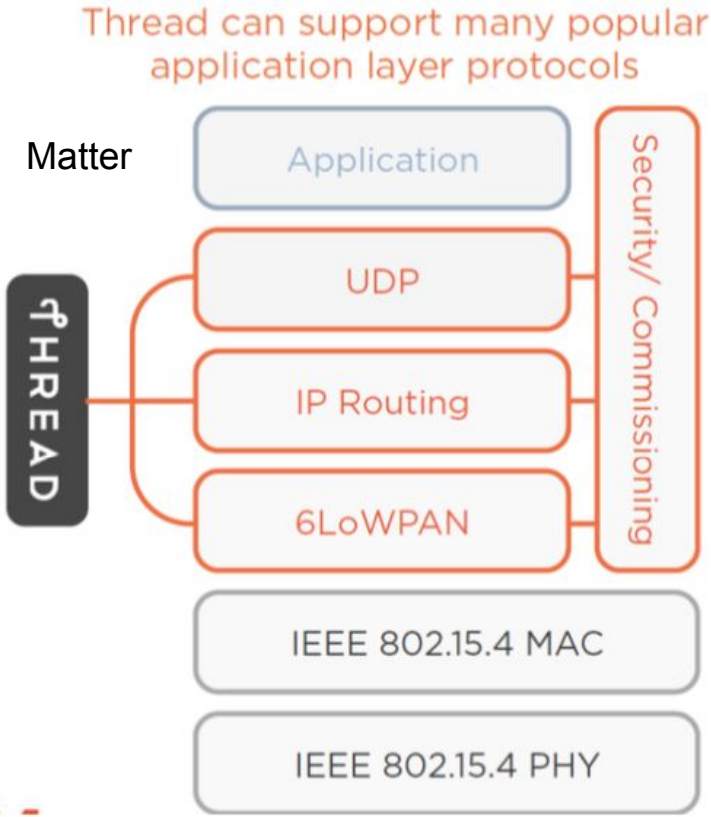


Classic XKCD comic about "new" standards

Thread and Matter Architecture

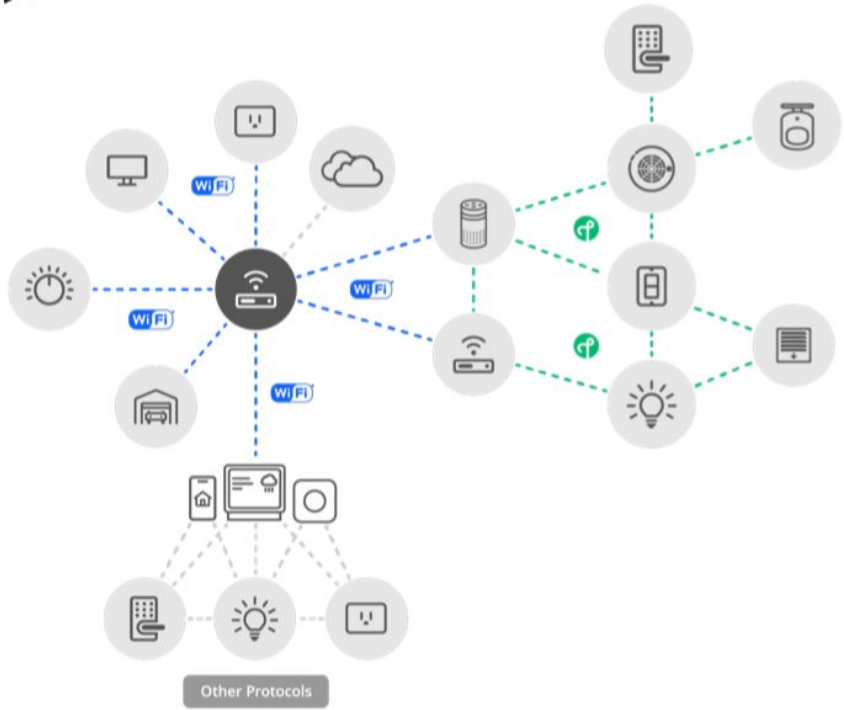
Build on Existing Technologies

- Same PHY as Zigbee (802.15.4)
  - Fast time to market
- IETF Link layer standards (6LoWPAN)
- Security / Simplicity
- Efficiency
- Thread Specification (1.2)



Matter

matter



- Devices are commissioned onto a Matter network via Bluetooth
- Matter devices connect to the network over Wi-Fi or Thread
- Thread devices connect to other IP networks through Border Routers
- Bridges can link to other protocols like Zigbee and Z-Wave

iOS 15 - Released on Sept 20, 2021

Matter

Project Connected Home over IP — officially renamed Matter — will be fully supported with iOS 15. Apple has more to share as far as the development of these devices, but it looks promising.

Apple says any device certified to work with Matter will be available right within the Home app and controlled via Siri. Over time, this should spur a greater number of supported smart home devices for HomeKit users.

Google Announces Matter Support

1. Google's bringing Matter to Nest and Android

Google and other leading tech companies are working together to develop Matter, the new protocol that simplifies smart homes by using one standard across the industry — and we're committed to supporting Matter. We're bringing Matter to Android and capable Nest products, powering them with interoperable control and enabling simpler setups.

Android will be one of the leading operating systems with built-in support for Matter, letting you quickly set up devices with Google and link your favorite Android apps. You'll only need a few taps to set up your Matter devices, and you'll have lots of ways to instantly control them such as Matter-enabled Android apps, Google Assistant, the Google Home app, Android Power Controls and compatible Google devices. It also allows over one billion Android devices to enable simple setup and control all Matter-certified products.

Source: https://blog.google/products/google-nest/four-google-smart-home-updates-matter/

Consumer Recommendations

Router Recommendations

Over the next 6-18 months when you look to buy a WiFi router there are a couple of things you should look for: WiFi 6 and Thread support. If you have a large area to cover then a mesh WiFi router is recommended.

1. Wi Fi 6 CERTIFIED
   IEEE 802.11ax
2. BUILT ON THREAD

Smart Home Device Recommendations

Any smart home device you purchase at a minimum should have Matter support so it can work with any other smart home devices that you purchase.

1 Wi Fi™ and/or BUILT ON THREAD

2 Bluetooth®

3 matter

Questions?

https://celestri.org
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v1.10

Appendix

Links

Wi-Fi Alliance - https://www.wi-fi.org/

Thread - https://www.threadgroup.org/
OpenThread - https://openthread.io/

Matter - https://buildwithmatter.com/

Connectivity Standards Alliance - https://csa-iot.org/

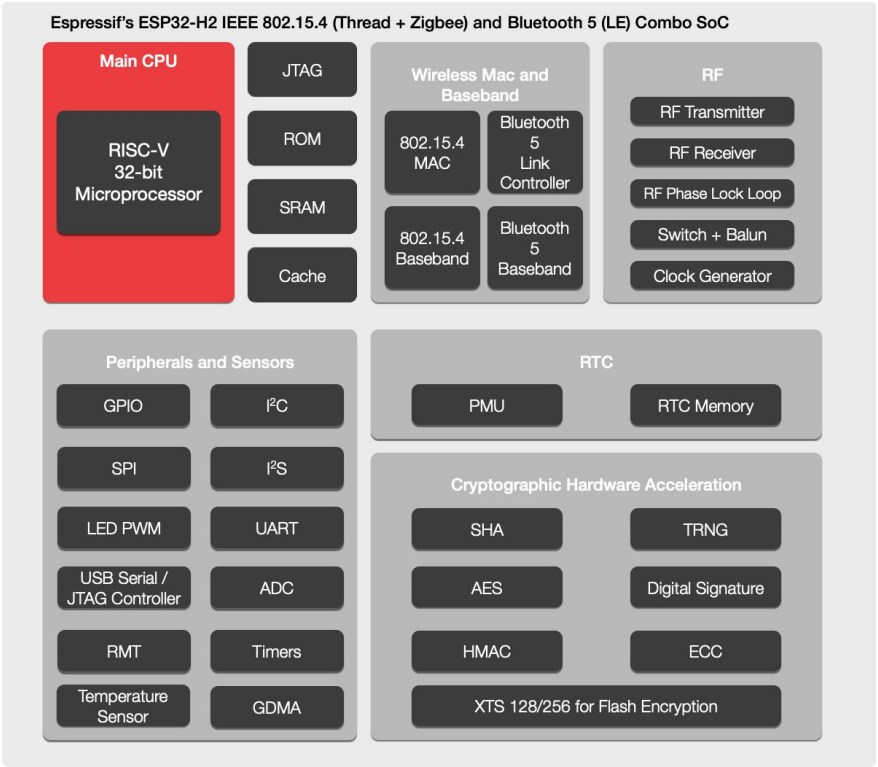
WiFi Specs

WiFi 6

IEEE Standard	802.11a	802.11b	802.11g	802.11n	802.11ac	802.11ax
Release	1999	1999	2003	2009	2014	2019
Frequency	5Ghz	2.4Ghz	2.4Ghz	2.4Ghz 5Ghz	2.4Ghz 5Ghz	2.4Ghz 5Ghz
Maximum Data Rate	54Mbps	11Mbps	54Mbps	600Mbps	1.3Gbps	10-12Gbps

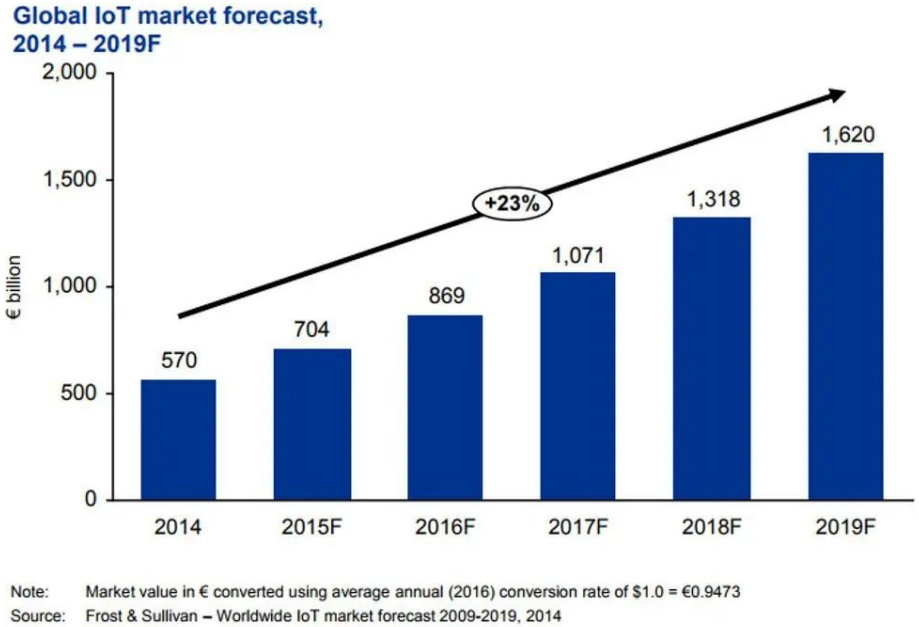
System on a Chip (SoCs)

Low cost SoCs from companies like Espressif will help drive the creation of new IoT and Smart Home products.

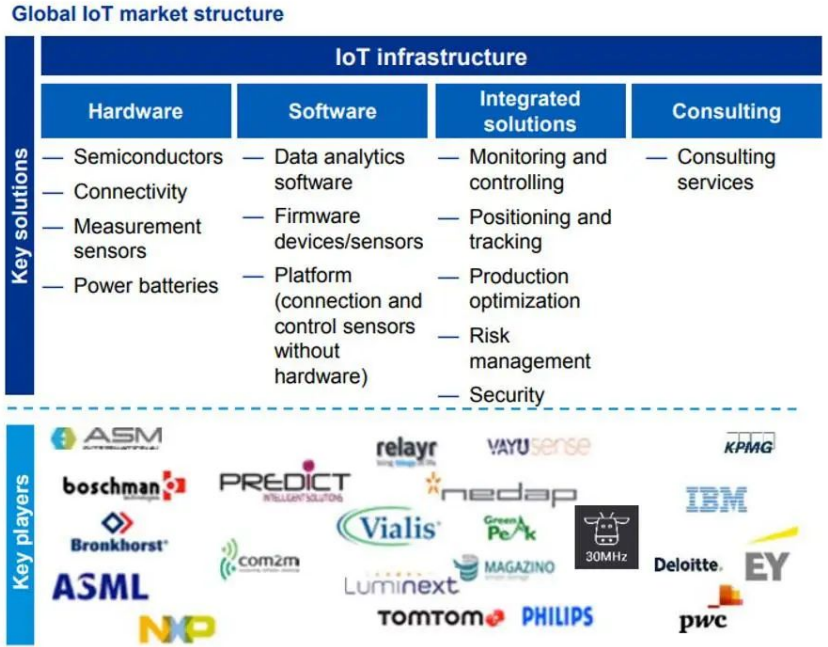


THREAD CERTIFIED COMPONENT

IoT Market Size

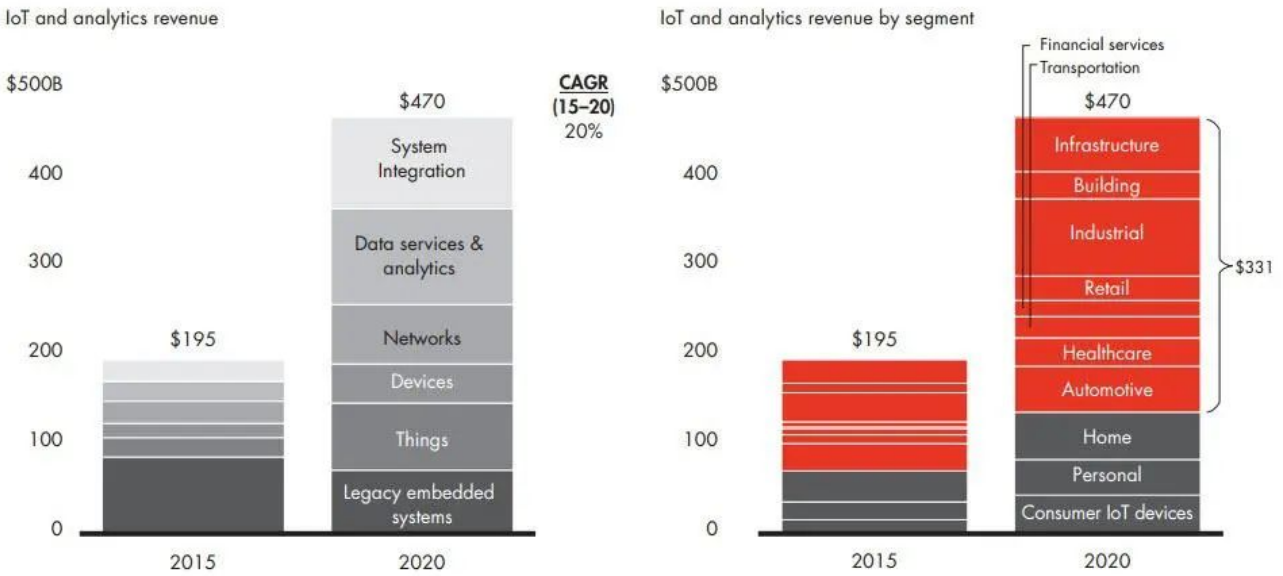


Note: Market value in € converted using average annual (2016) conversion rate of $1.0 = €0.9473
Source: Frost & Sullivan – Worldwide IoT market forecast 2009-2019, 2014



IoT Market Size

Figure 1: B2B segments will generate more than $300 billion annually by 2020, including about $85 billion in the industrial sector



Notes: Things and legacy hardware include semiconductors for sensing, communication, processing, memory and modules (boards for housing silicon); consumer IoT devices includes hobbyist drones, smart garments, smartwatches, sports watches, wearable cameras, wristbands, head-mounted displays, other fitness monitors; data services includes the value of subsidized consumer IoT devices

Sources: Gartner; IDC; Harbor; Cisco; Ericsson; Machina Research; Ovum; industry interviews; Bain & Company