

THE DEVICE LANDSCAPE:

# **ANALYSIS OF 1.7 BILLION CONNECTED CONSUMER DEVICES IN NORTH AMERICA**

2022

# Introduction

This is an annual report from CUJO AI Labs on the state of connected consumer devices in North America. It examines the most recent trends, areas of growth and opportunities for network service providers, based on precise data about over **1,707,000,000 consumer devices**. This is the largest and most precise report of its kind and covers the period between April 1, 2021, and April 1, 2022. For earlier data, please see our [previous report](#).

## Airties

The last section of this report that covers Wi-Fi use in Europe and North America is provided by our partner Airties, which provides smart Wi-Fi solutions to broadband operators.



**Knowing what devices are operating on a network is essential for preventative cybersecurity.** We identify devices to alert consumers and network operators whenever a device starts acting out of character, which is a sign that the device is compromised by malware or malicious actors.

The device landscape is changing in tangible ways as people use more and more connected devices. Some of those devices have certain risks to their users, which often fly under the radar of the average consumer. A great deal of engineering and ingenuity goes into the device intelligence solution behind CUJO AI Explorer.



**Kimmo Kasslin**

VP of Research  
Laboratories  
CUJO AI

# Methodology

The information in this report was compiled using the following resources:

## CUJO AI Labs Insights

The CUJO AI Labs team provided in-depth analysis and historical data about the distribution, usage and identification of over 50,000 different device types and models on consumer networks. The scale and precision of our data come from advancements of the CUJO AI Labs Device Intelligence team, which has [developed robust artificial intelligence](#) algorithms that can classify device types and models with extreme precision.

## CUJO AI Explorer Data

[CUJO AI Explorer](#) is the cutting-edge device intelligence, identification and classification solution for large Network Service Providers (NSPs), deployed at an unmatched scale—over 1.7 billion devices. AI algorithms in CUJO AI Explorer identify and classify connected devices down to the operating system's version. CUJO AI Explorer provides NSPs with the highest quality data about the connected consumer device ecosystem while being fully compliant with the best privacy practices.

Device identification algorithms used in Explorer are proprietary solutions patented by CUJO AI. They analyze connectivity metadata and technical aspects of every device connected to a network operator's network to determine:

- The type of device that connects to a network: laptop, mobile, smartwatch, or any of the other 60+ categories of devices
- The brand or make of the model: Apple, Nintendo, etc.
- The OS version or configuration of the device: iOS 15.4.1, Windows 11, etc.

CUJO AI Explorer can identify over **50,000** device models and configurations.

# The Many Uses of Device Intelligence

Device intelligence is an essential part of our [multilayer security](#) solution. CUJO AI's security algorithms use device identities to determine whether there is anything suspicious about a given device. For example, an IP camera that starts sending data to an unusual location can be flagged and reported to the user or simply quarantined from direct access to the Internet. In the past, when individual infected devices would threaten an NSP's infrastructure, there would be no other option than to cut off the user's access to the Internet entirely.

Device identities also provide other significant improvements to both end users and service providers. Subscribers can get detailed information about their home network, making it easy to manage from the end user's side. Service providers can use precise device inventories to plan crucial network optimizations, upgrades and maintenance.

Optimizing the entire telecommunications network up from the home network is key to meeting the bare minimum expectations of today's consumers. Going beyond network optimization, a precise device inventory enables the network service provider to **create personalized, relevant and fulfilling online experiences** as well as new solutions and product offerings that better serve every subscriber.



Device characteristics enable network service providers to offer personalized and optimized online experiences for streaming, gaming, video calls and other use cases. Precise device identities are also crucial for network operators facing major challenges in transforming into truly data-driven businesses. Having a future-proof device inventory can improve almost every aspect of a telecommunications company.

Device identities not only improve cybersecurity and reduce strain on network operations, but they can also help to determine network upgrade cycles and improve customer care times as well as uncover new opportunities for relevant services and product offerings. In some cases, this data might help them to personalize marketing activities. We're clearly seeing these transformations happen at the network service providers we're working with.



**Ivar Beljaars**

SVP of Sales  
CUJO AI

# Data

The data presented in this report is aggregated and fully anonymized before leaving any NSP's servers and does not use any privacy-invading technologies.



CUJO AI's privacy compliance is a key value of our service. We ensure no personal data leaves the customers' premises without several steps that decouple the data from the user and the device.

Our process uses several steps of anonymization and pseudonymization. Anonymization removes any identifying information, such as emails, names or passwords, and replaces it with placeholders. Some data are essential for the operation of our services but are personal and therefore pseudonymized and never stored in cleartext. We encrypt this data with state-of-the-art encryption, using unique cryptographic keys in each environment. All data is encrypted both in transit and at rest.



**Matteo Cafasso**

Lead Architect  
CUJO AI

A sample of the anonymized and pseudonymized data CUJO AI Labs use to improve device intelligence and other services:

Hostname: JohnDoe-iPhone →  
{{NAME-[f-bead7ee21e099d7e7985e2f571f4c0d1b0665efdd13992c4f20234eeec8d595]}}-iPhone

MAC address: fa:60:db:a6:c7:12 →  
fa:60:db:0610dcaca370-fa8350042e28ab9c0926d298bbd5b521a6cb218e691d04513d8b

Device distributions are presented as percentages of the overall device population (over 1.7 billion devices). **The popularity of a category or device is shown as a percentage of all new devices connected** during the month. This approach is chosen as the best representation of the consumer device ecosystem, where a core indicator of a device's rising adoption is its relative popularity to other devices. Data points for months indicate the last day of the month and show devices connected during that month. Graphs that show the overall popularity of a category, device type or model are based on the entire database of devices in current use (i.e., over 1.7 billion devices).

CUJO AI categorizes devices into more than 60 distinct categories. Some niche categories (e.g., smart industrial fans) are not shown in the report for the sake of brevity. Find more information on the report and any new additional data on [our device intelligence statistics page](#).

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# The Connected Device Landscape

# The Connected Device Landscape

Large network service providers have tens of thousands of distinct device types, models and configurations (OS or firmware versions, etc.) online at any given moment. We group these devices into over 60 categories, ranging from smartphones to various niche Internet of Things (IoT) gadgets.

The report covers **1,707,000,000 devices** in North America, which were identified by our device intelligence algorithms by April 1, 2022. The information [in the report](#) spans a year, and new device adoption or popularity figures are presented on a monthly basis, indicating the popularity of a device as a percentage of all new connected devices in that month. For longer and more up-to-date trends, please refer to our [Connected Device Statistics page](#) or read our previous report on [the State of Connected Devices in North America in 2020/21](#).



**Every month, tens of millions of new devices are connected and identified by our device intelligence solution.** Thanks to the scale of CUJO AI, we have the largest and most up-to-date data set to train our machine learning algorithms on. Our device intelligence algorithms evolve with every new device and update we encounter.



***Karolis Povilavičius***

DI Lab Manager  
CUJO AI

This section of the report is structured in four chapters that present last year's device adoption trends in groups:

1. Two of **the most popular devices** are smartphones and computers, collectively making up over 50% of all connected devices.
2. **Popular device** categories make up 3%-7% of all connected devices.
3. **Common device** categories make up 0.5%-3% of all connected devices.
4. **Niche device** categories make up 0.05%-0.5% of all connected devices.

Other sections of the report will examine separate device categories for the most significant fluctuations and trends that appeared or continued this year.



Certain device types are deterministic in nature. By observing their behavior on the network, we can determine what is anomalous for that particular device type or model. The fundamental knowledge of active device types and models is crucial to prevent abnormal activities such as botnet-related communication patterns or participation in coordinated DDoS attacks.



**Leonardas Marozas**

Security Lab Manager  
CUJO AI



We have an extensive and growing coverage of consumer devices, which is reflected in the size of our data sets. Throughout last year alone, our algorithms identified close to 1 billion devices in this region.

The insights that we share in this report are just a small part of what network operators can discover about their device inventories. Analyzing each category and device combination separately could produce a separate report of this size.



**Sigitas Bartusevičius**

Labs Data Engineer  
CUJO AI

#### THE MOST POPULAR CONNECTED CONSUMER DEVICES IN 2022

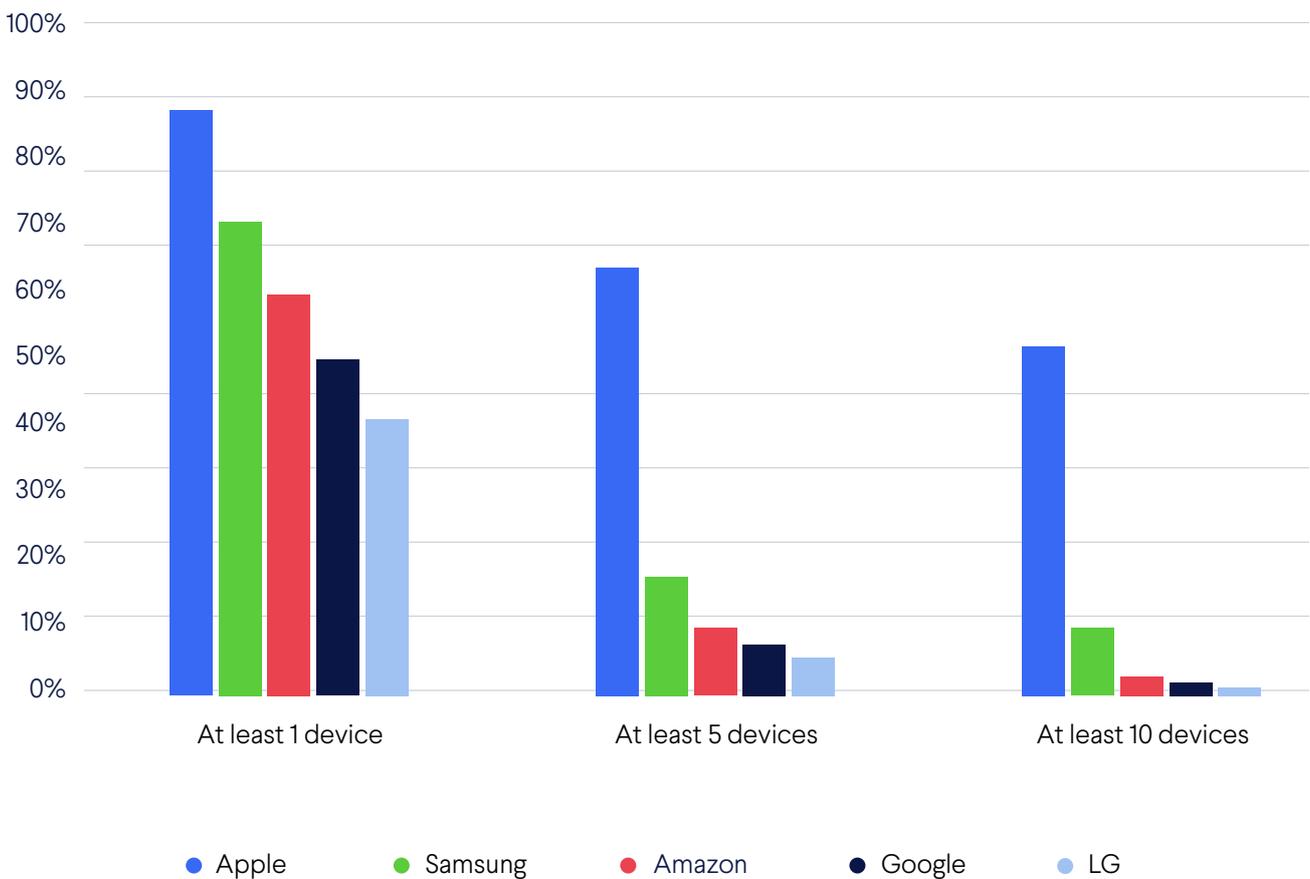
- Phones 41.27%
- Computers 17.51%
- Tablets 8.98%
- Watches 5.51%
- Game Consoles 4.87%
- Smart TVs 4.24%
- Routers 3.93%
- Streaming Video Devices 3.49%
- Voice Control Devices 1.91%
- Printers 1.56%
- Cameras 1.20%
- Set-top Boxes 1.03%
- Niche Devices 2.89%
- Other 1.61%

## The Most Popular Brands

Apple has both the highest penetration and affinity in the consumer connected device ecosystem. The vast majority of households have at least one Apple device (89%), followed by Samsung (73%), Amazon (54%), Google (45%) and LG (37%).

Apple's customers are also more likely to have five or more devices from the brand (67%), which is not the case with other brands: only 25% of Samsung's users have five or more Samsung devices. This is mainly due to Apple's dominance in the mobile device (phone, tablet and smartwatch) market, as shown in the following sections of this report.

### BRAND PENETRATION AND AFFINITY



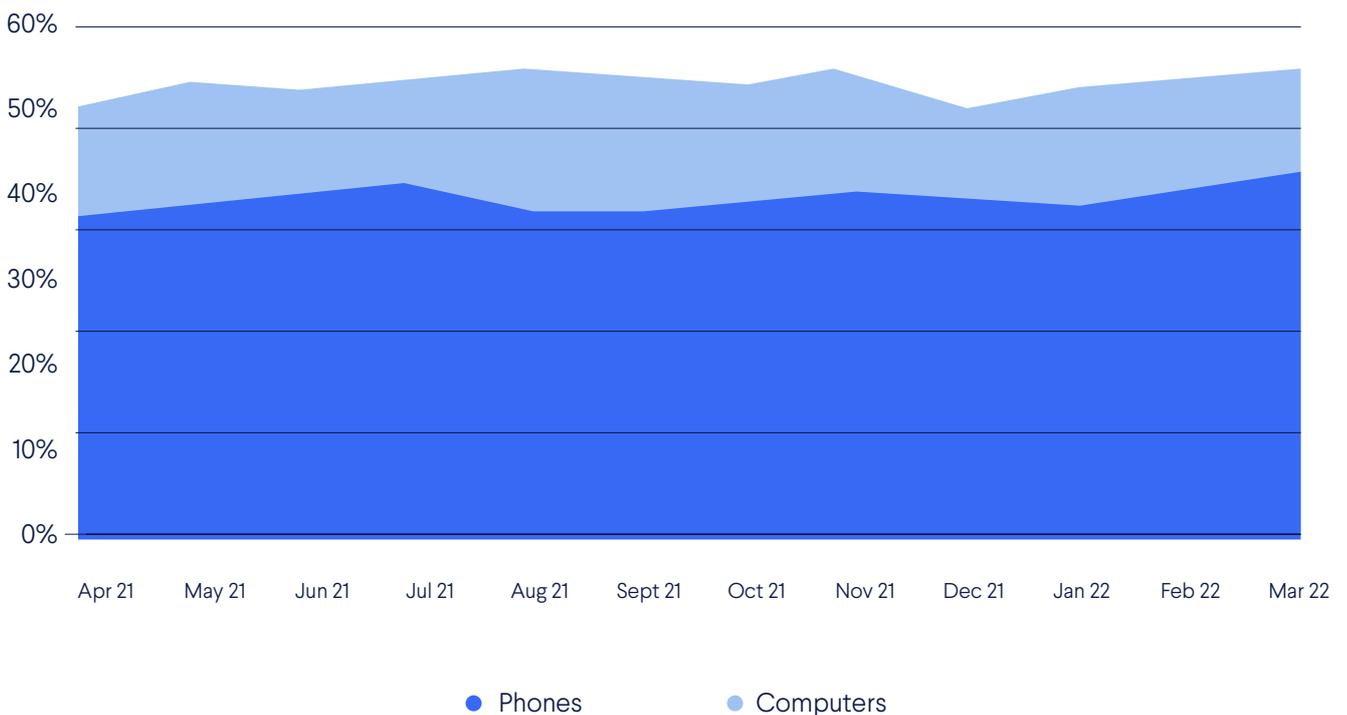
## The Most Popular Devices: Smartphones and Computers

Smartphones and computers (desktops and laptops combined) are the most common connected devices overall. **These two established device categories make up over 50% of all connected devices.**

Smartphones alone make up over a third (41%) of all connected devices, more than twice that of computers (17.5%). This state is unlikely to change soon, as our data shows that these two types of devices take up essentially the same proportions of new connected devices every month.

Unlike last year, there was no month when phones and computers collectively made up less than 50% of all new connected devices.

**THE MOST POPULAR DEVICES: COMPUTERS AND PHONES**  
as percentages of all new connected devices every month



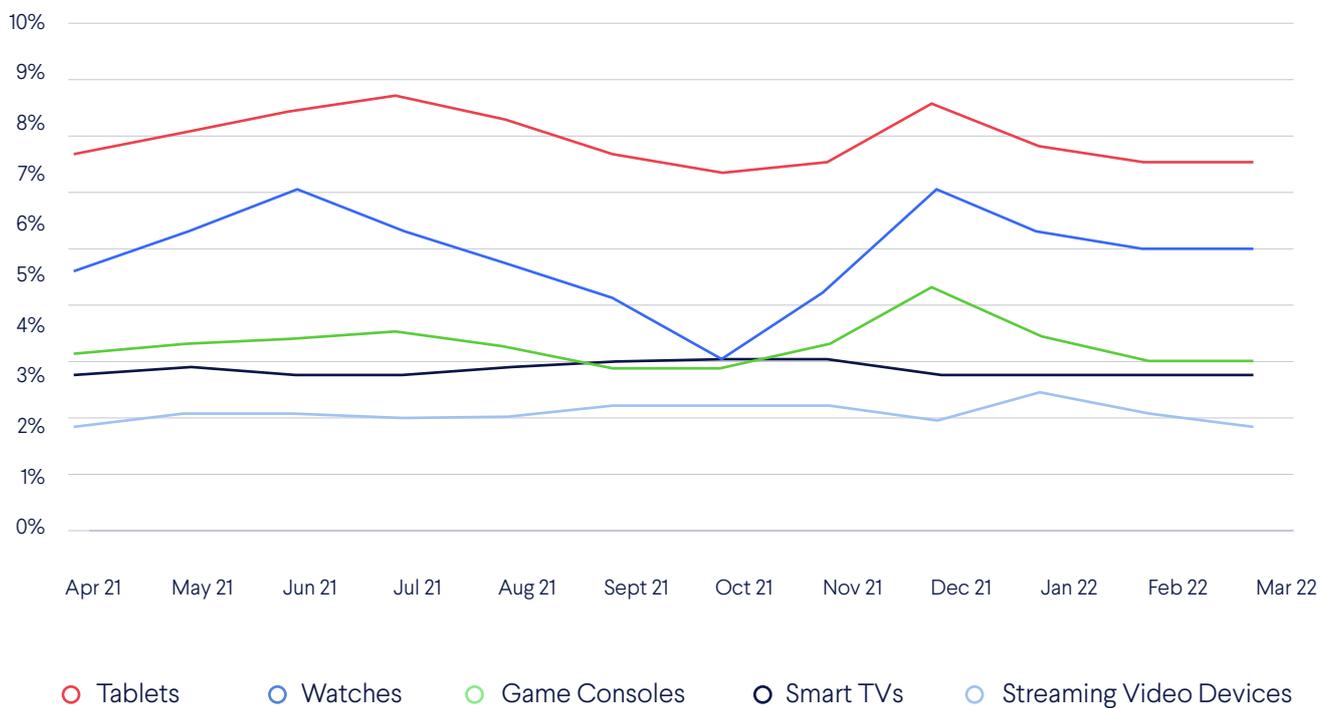
## Popular Devices: Tablets, Smartwatches and Entertainment Devices

Entertainment plays a key role in the way consumers use their Internet connections. Smart TVs, streaming devices, and game consoles are popular devices with very large populations online. Smartwatches and tablets are still showing strong adoption trends and remain in the top four of all connected devices, making up 5.5% and 9% of all devices, respectively.

Three devices in the popular device group also experienced substantial upticks in popularity during the holiday season. We will examine these fluctuations in other sections of the report.

### POPULAR DEVICES

as percentages of all new connected devices every month



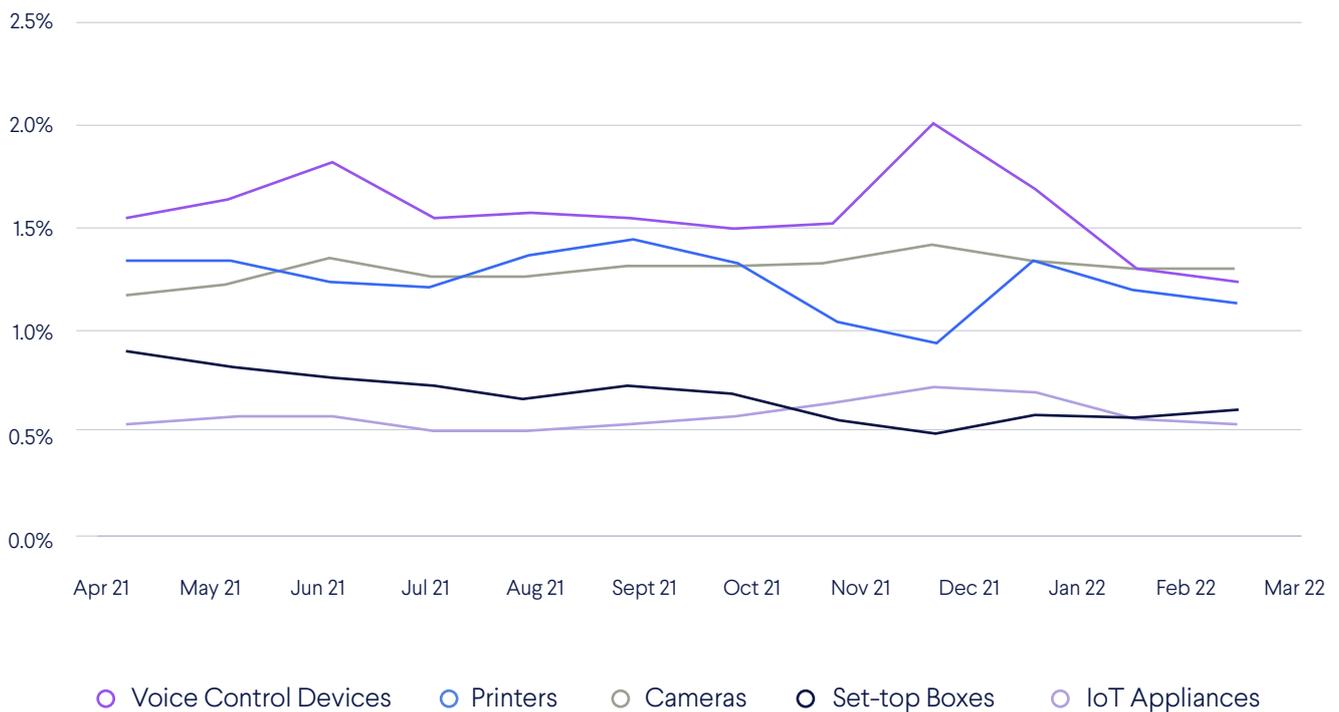
It is also notable that smart TVs and streaming video devices both have stable niches in the market and are not gaining much more popularity, perhaps signaling a point of market saturation.

## Common Devices: Voice Control, Printers, Cameras and Other IoT Devices

Internet of Things (consumer IoT) devices are quite common and make up between 0.5%-3% of all connected devices. Our data shows that voice control devices were a popular gift during the holidays, while connected printers and set-top boxes might be on a slow decline in terms of popularity.

### COMMON DEVICES

as percentages of all new connected devices every month



## Niche Devices: Deeper Into the Internet of Things

Niche device categories have a seemingly small footprint—each category makes up just 0.0%–0.5% of the entire connected device landscape or around 3% collectively. Nevertheless, every one of these categories represents millions of devices with new and exciting use cases.

To avoid confusion, we present the overall picture of niche device distribution and will dig into the most interesting trends and fluctuations in popularity in the following sections of the report.

### NICHE DEVICES

in total, these devices comprise around 3% of all connected devices

Wireless Audio Devices 13%

Thermostats 11%

E-readers 10%

Portable Music Players 9%

Lighting Appliances 9%

Audio-video Devices 8%

Doorbells 7%

Outlets 6%

Alarm Systems 5%

DVRs 5%

Robots 4%

Smart Home Automation Devices 4%

Garage Openers 3%

Sports & Fitness Devices 3%

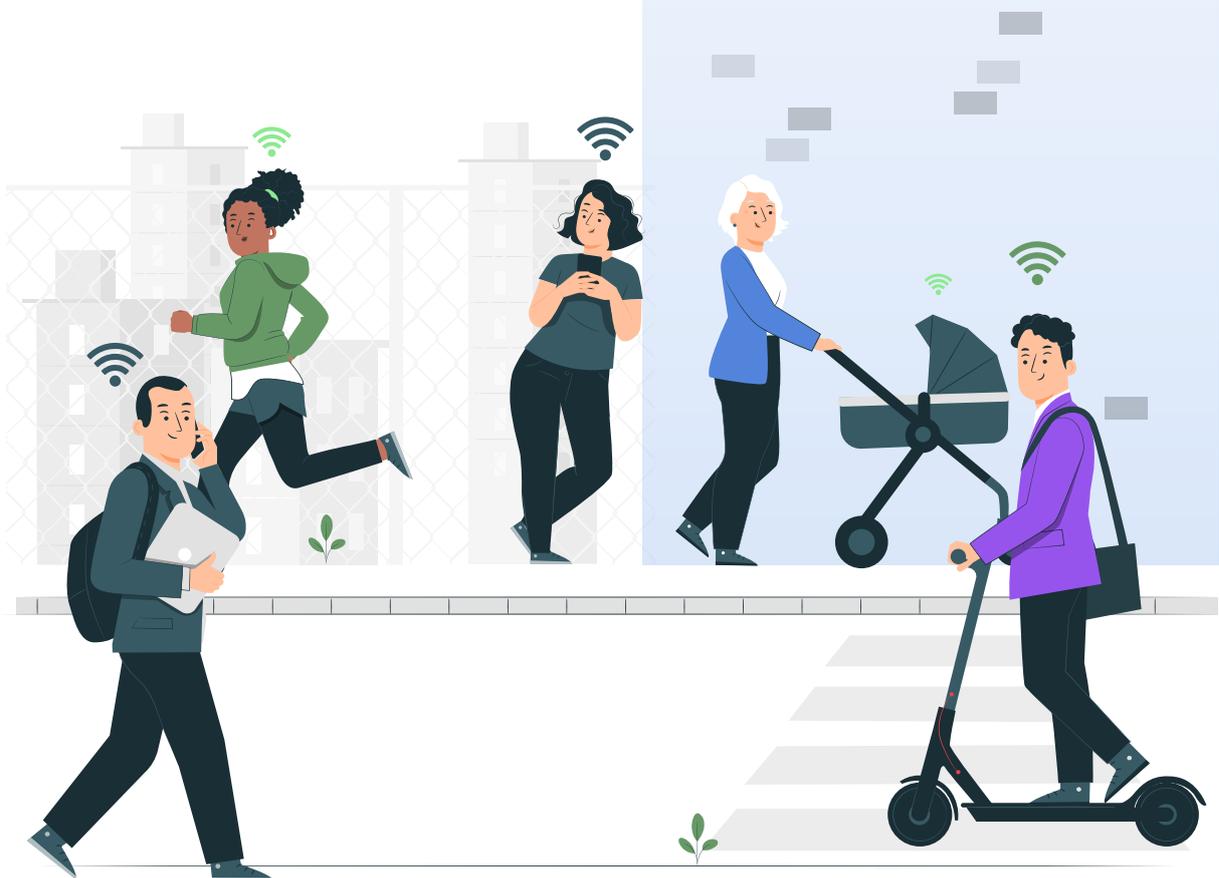
Cars 2%

## Key Takeaways

Device connectivity after the holiday season remains a key period to monitor for new device adoption trends. The largest upticks in device popularity happened in November and December, showing consumer desirability for certain devices.

As mobile devices continue to dominate, device security outside the home network remains a key concern for both consumers and network operators, which is addressed by [CUJO AI On The Move](#).

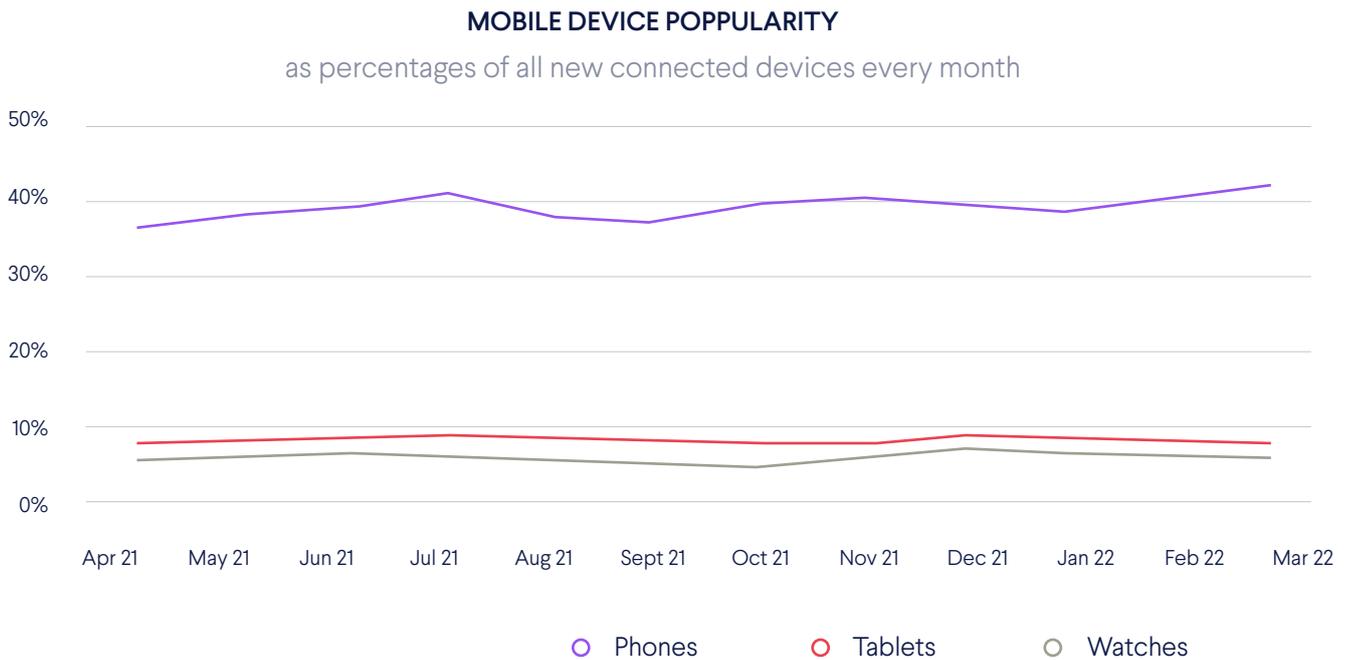
Dozens of IoT categories have significant populations on consumer networks, and their security is often questioned by their vendors' poor support policies. This warrants a deeper analysis of the most popular brands of devices that are showing strong adoption trends.





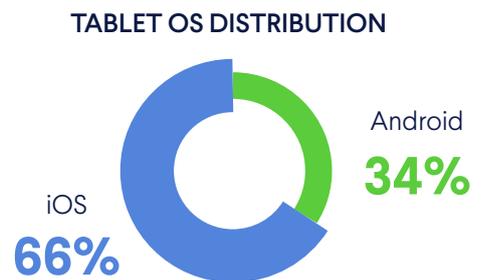
# The Mobile Device Ecosystem

Mobile devices are dominating the connected device landscape. Phones make up over one-third of all consumer devices on the Internet, while tablets and smartwatches make up 9% and 5.5% of all consumer devices, respectively.

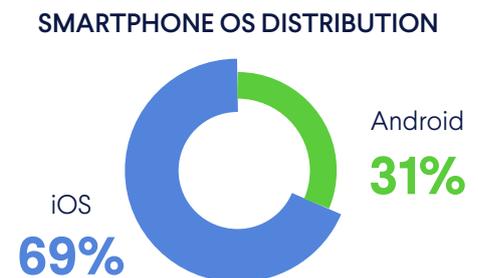


## Mobile OS Popularity

In terms of mobile OS popularity, Apple's iOS is quite a bit more popular than Android in all three mobile device categories. In terms of phones and tablets, iOS devices hold two-thirds of the market share.



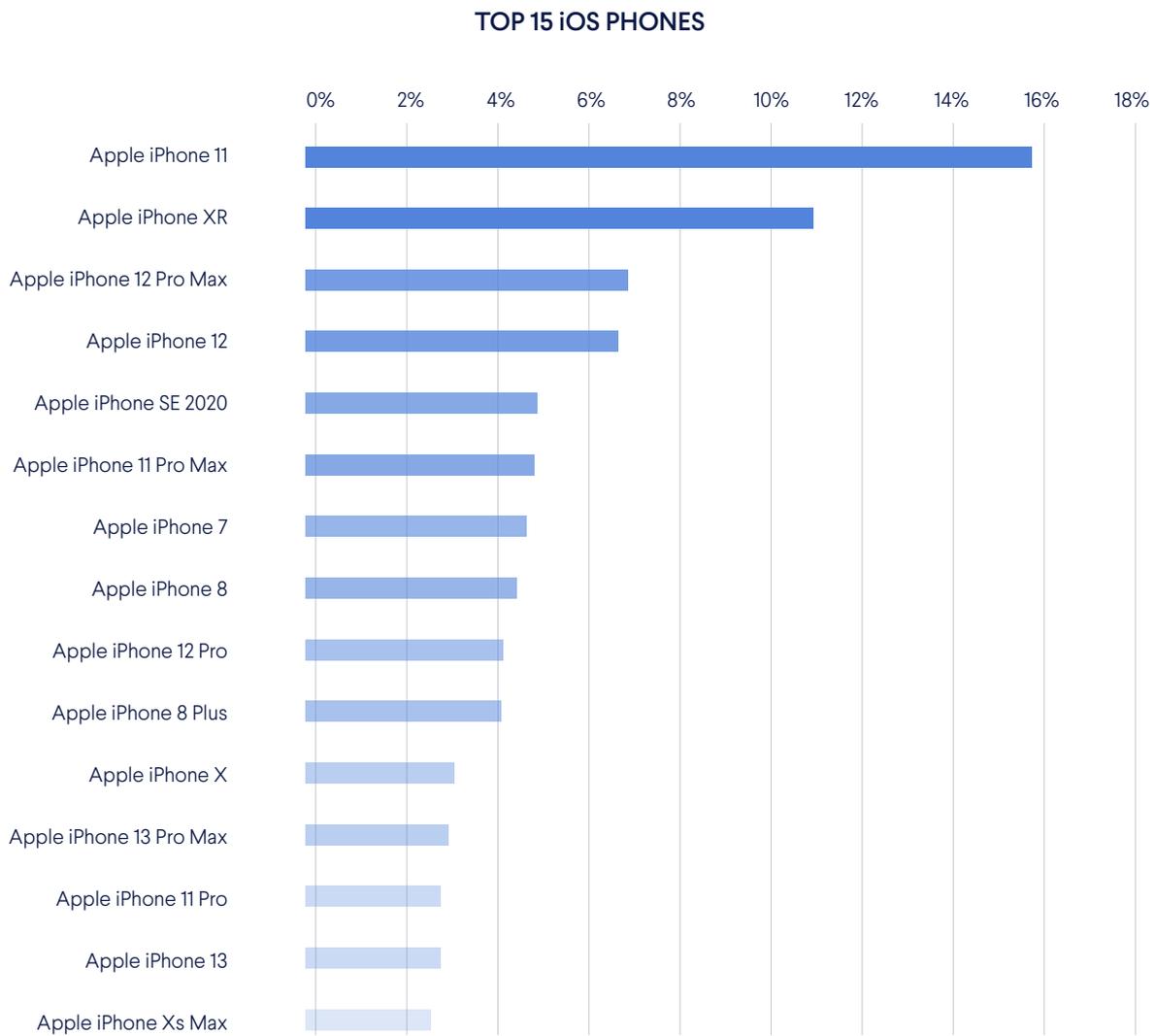
The disparity is even starker in the smart watch ecosystem, where Apple's watches thoroughly dominate with over 90% penetration.



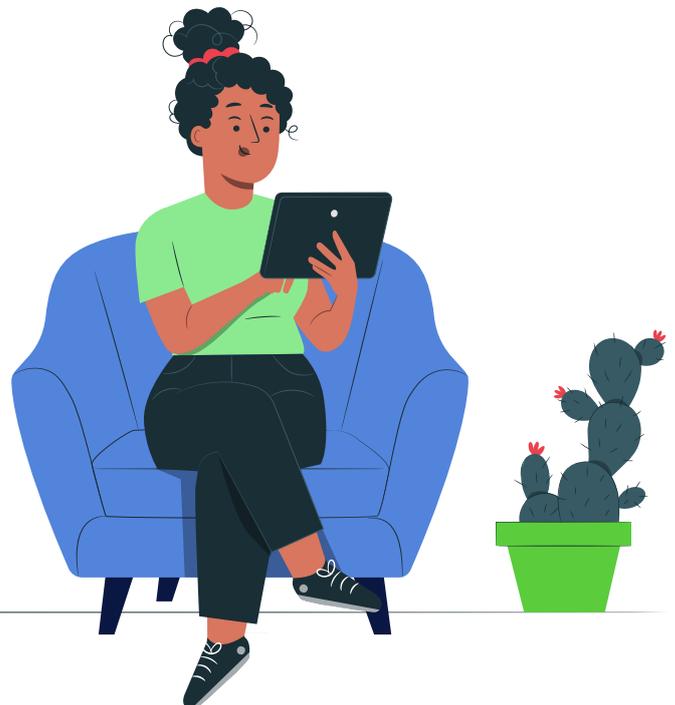
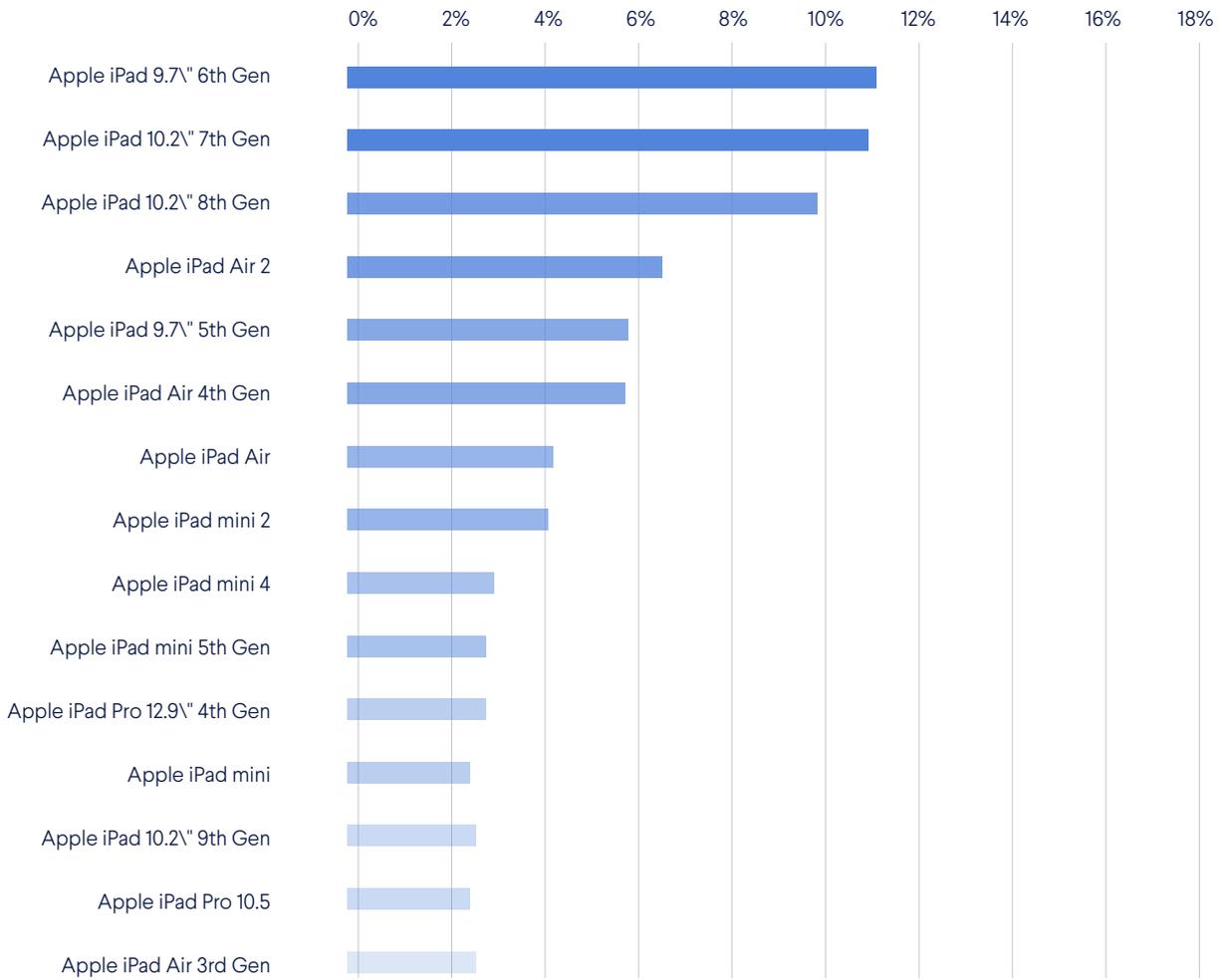
*Note: This report analyzes data from North America, which has shown a much larger affinity for Apple.*

## The Most Popular iOS Models

Quite surprisingly, the newest iPhone models have yet to catch up to the iPhone 11. We also see strong populations of several older models, namely the iPhone 7 and 8. Fortunately, these models are still supported with updates by Apple.



### TOP 15 iOS TABLETS



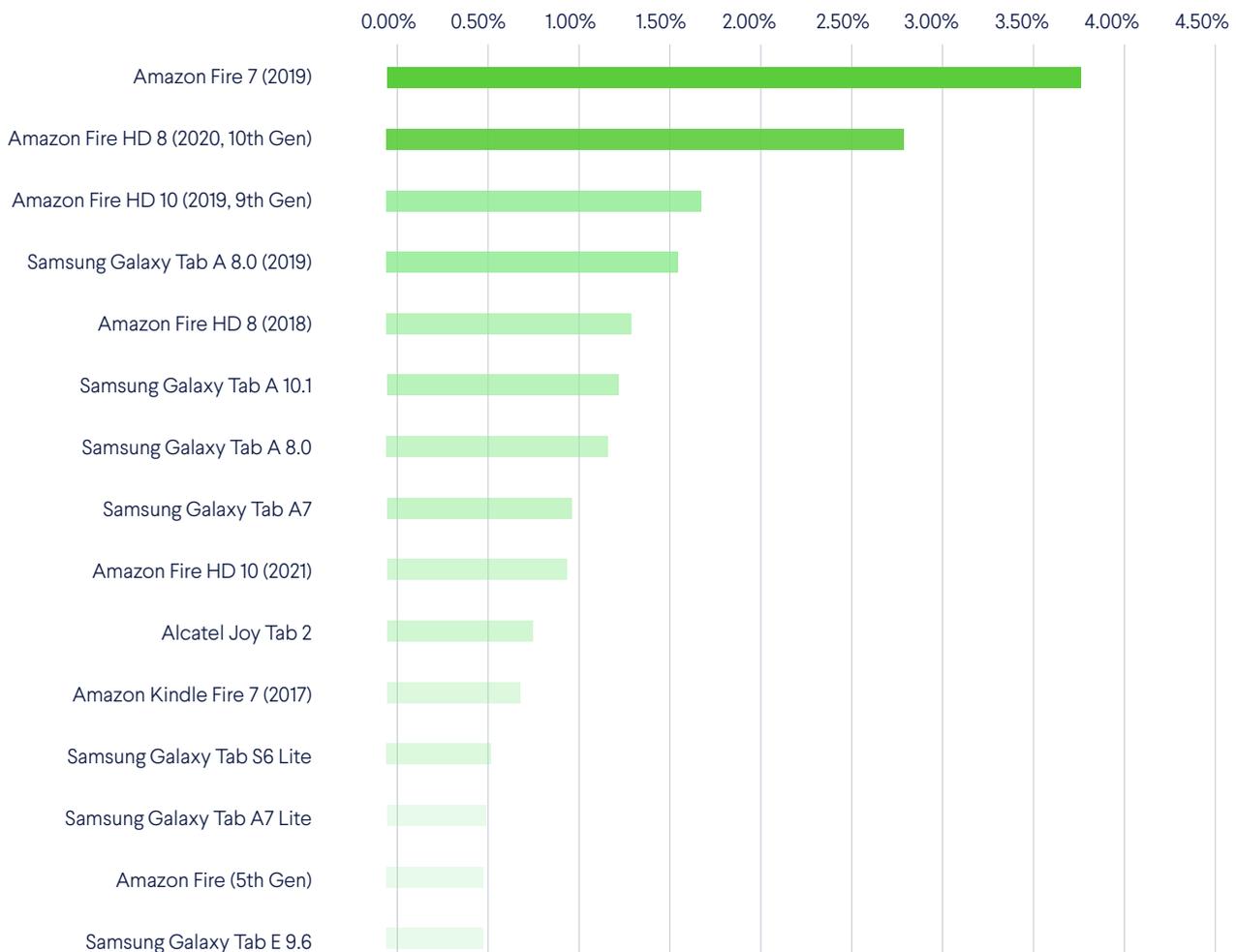
## The Most Popular Android Models

The Android OS ecosystem remains extremely fragmented, with over 9,000(!) device models identified. The most popular Android phone is the Samsung Galaxy S9, which makes up just 2.5% of all Android devices.

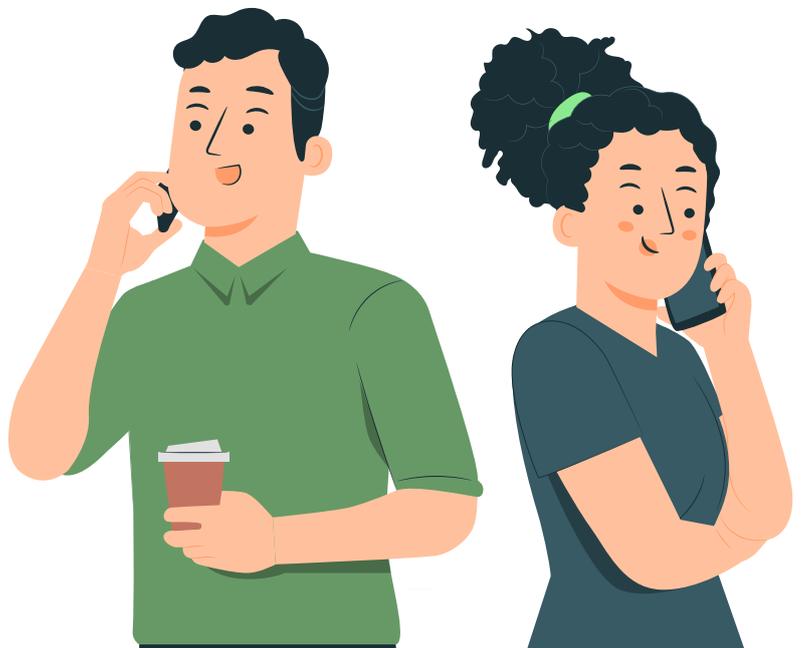
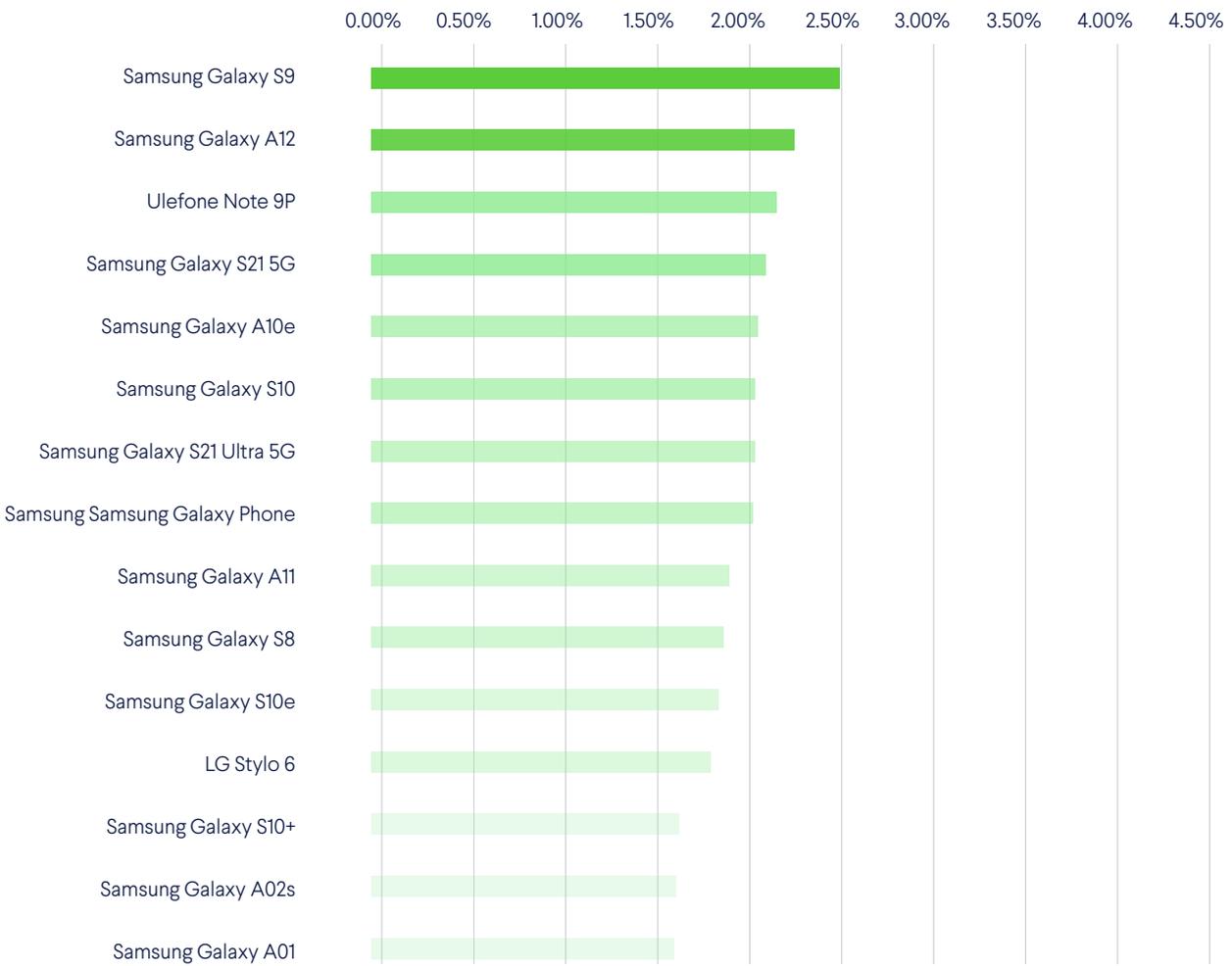
In terms of tablets, Amazon is the dominant Android brand in North America. Yet even their most popular Android tablet makes up just under 4% of the entire Android tablet ecosystem, with over 2,000 different models.

As discussed in our previous report, the support state of many of these devices is dubious, yet the fragmentation has some advantages, as it makes it harder for attackers to exploit Android devices at scale.

TOP 15 ANDROID TABLETS



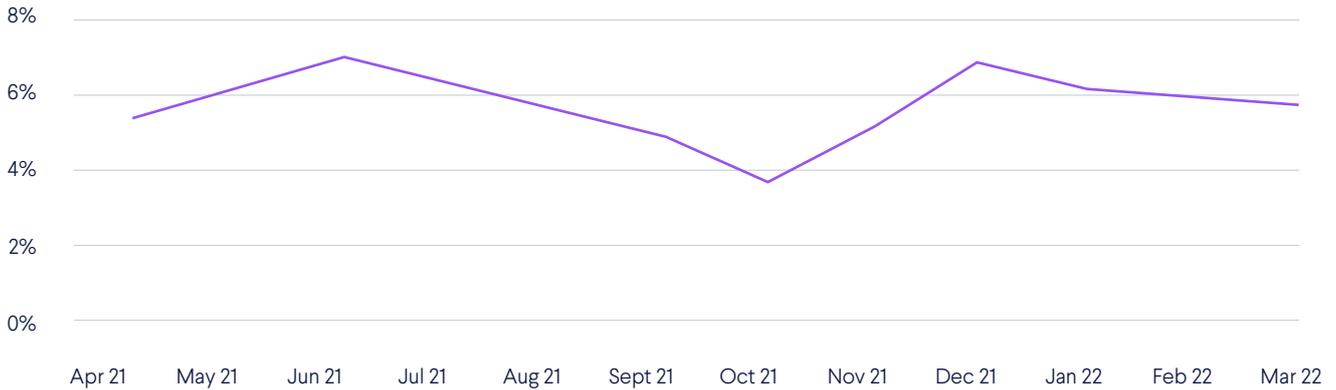
### TOP 15 ANDROID PHONES



# Smartwatches

## SMARTWATCH POPULARITY

as percentages of all new connected devices every month

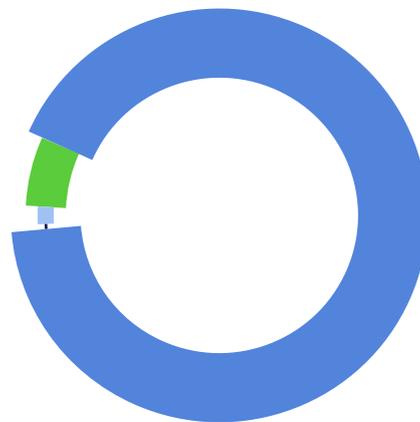


## MOST POPULAR SMARTWATCH BRANDS

Smartwatches continue to show strong adoption and grow in number. Overall, smartwatches make up 5.5% of all connected devices, and the category’s monthly popularity shows continuing growth, with most months of the year outperforming the baseline.

Apple dominates the space with well over 91% of all smartwatches. Samsung (5.92%), Fitbit (1.71%), Garmin (0.32%) and Fossil (0.03%) are the only other noticeable brands in the space, with others having negligible footprints among the connected smartwatch population.

Smartwatches have sustained the rise in popularity we’ve observed in last year’s report, and no other wearable device (e.g., specialized health devices) seems to be having as much adoption.



|               |              |
|---------------|--------------|
| Apple         | Samsung      |
| <b>91.90%</b> | <b>5.92%</b> |
| Fitbit        | Garmin       |
| <b>1.71%</b>  | <b>0.32%</b> |
| Other         | Fossil       |
| <b>0.11%</b>  | <b>0.03%</b> |

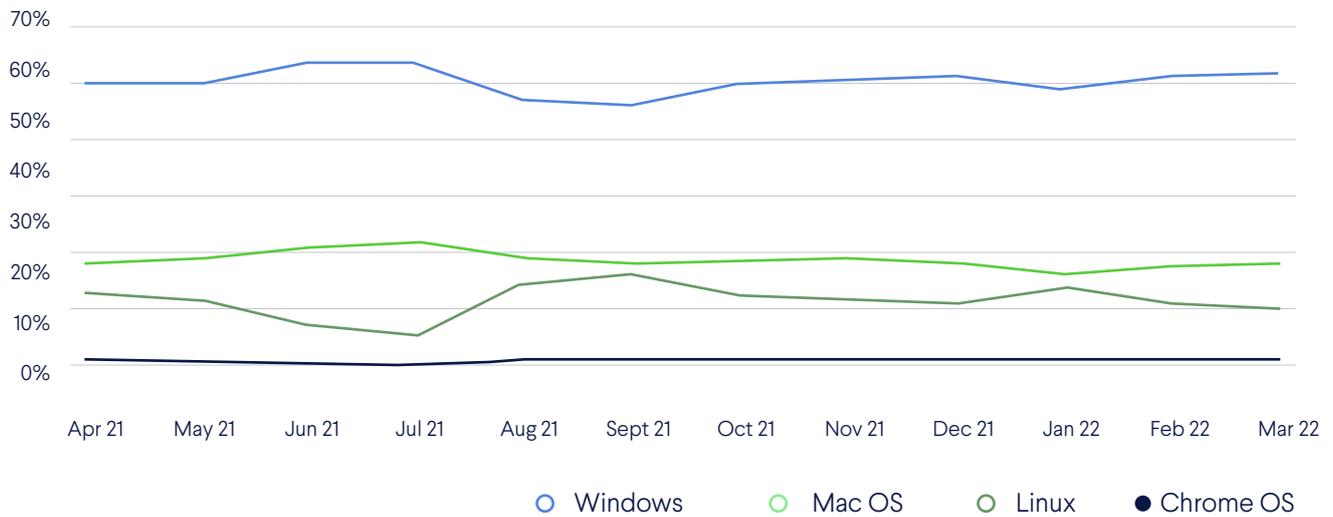


# Computers

Computer use had not changed significantly throughout the year, except for the period between August and September, when the new school year brought significantly more computers online. These were mainly Linux and Chromebook computers.

## OS POPULARITY: NEW COMPUTERS CONNECTING MONTHLY

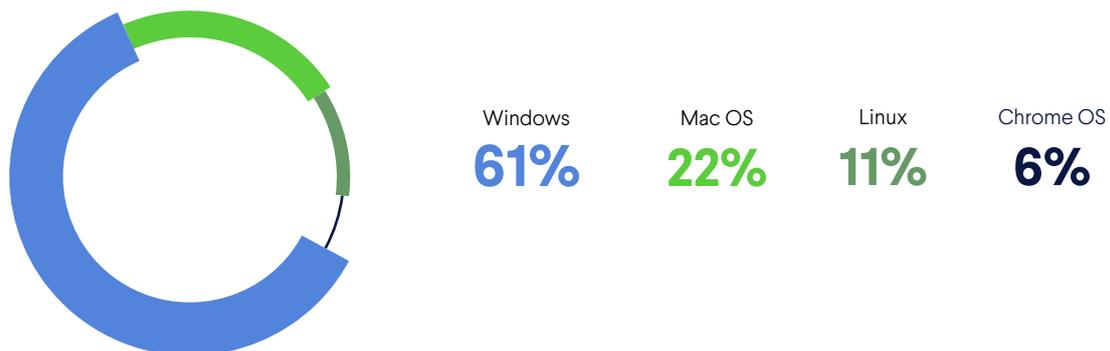
April 1, 2021–April 1, 2022



Overall, the computer OS ecosystem is still dominated by Windows, with a healthy 61% of the consumer computer market, trailed by Mac OS (22%), Linux (11%), and Chrome OS (6%) devices.

## COMPUTER OS DISTRIBUTION

all computers, April 1, 2022



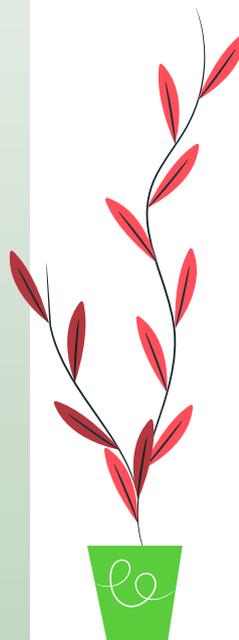
# The Holiday Effect

# The Holiday Effect

The holiday season between Black Friday and New Year's Eve is when many people purchase and connect new devices. Overall, it is not uncommon to see up to 50% more new devices coming online in December than in other months. November sees a smaller spike, as many Black Friday and Cyber Monday deliveries do not arrive instantly, and some devices purchased then are meant to be holiday presents.

Nevertheless, it seems that only specific devices are preferred as holiday presents. This section of the report examines several outliers that evidently were the preferred choices for holiday purchases last year.

Quite a few device types experienced major increases in new devices in December (again, these increases are above the usual 50% increase in overall new device connections).



### GAME CONSOLES



### E-READERS



### BABY MONITORS



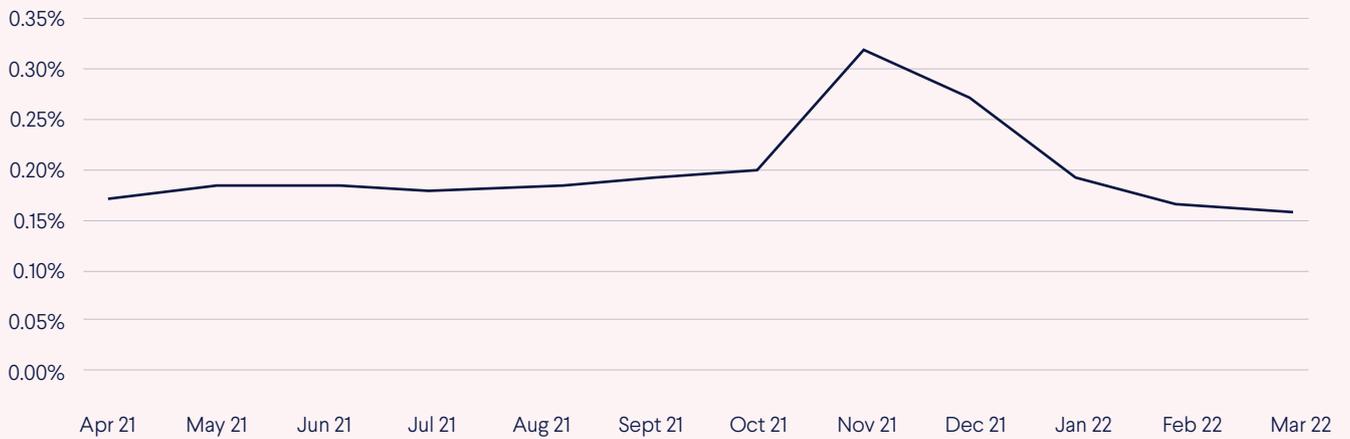
### VOICE CONTROL DEVICES



### LIGHTING APPLIANCES



### OUTLETS



Game consoles, voice control devices, baby monitors, e-readers and smartwatches (see the section on mobile devices) have been favored gifts for quite some time, but a few new devices apparently appeared on many shopping lists last year.

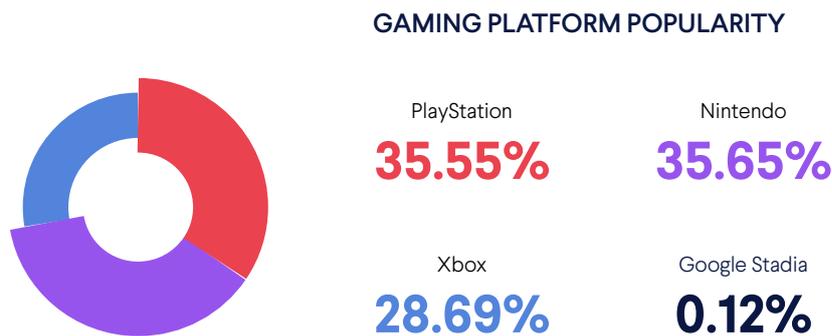
Smart lighting devices and outlets were extremely popular during this holiday season, which encouraged us to take a closer look at other energy-related smart devices, which we will review in the section on the smart home.

It is notable that e-readers seem to be in an overall decline since the lockdowns ended in the US and Canada.

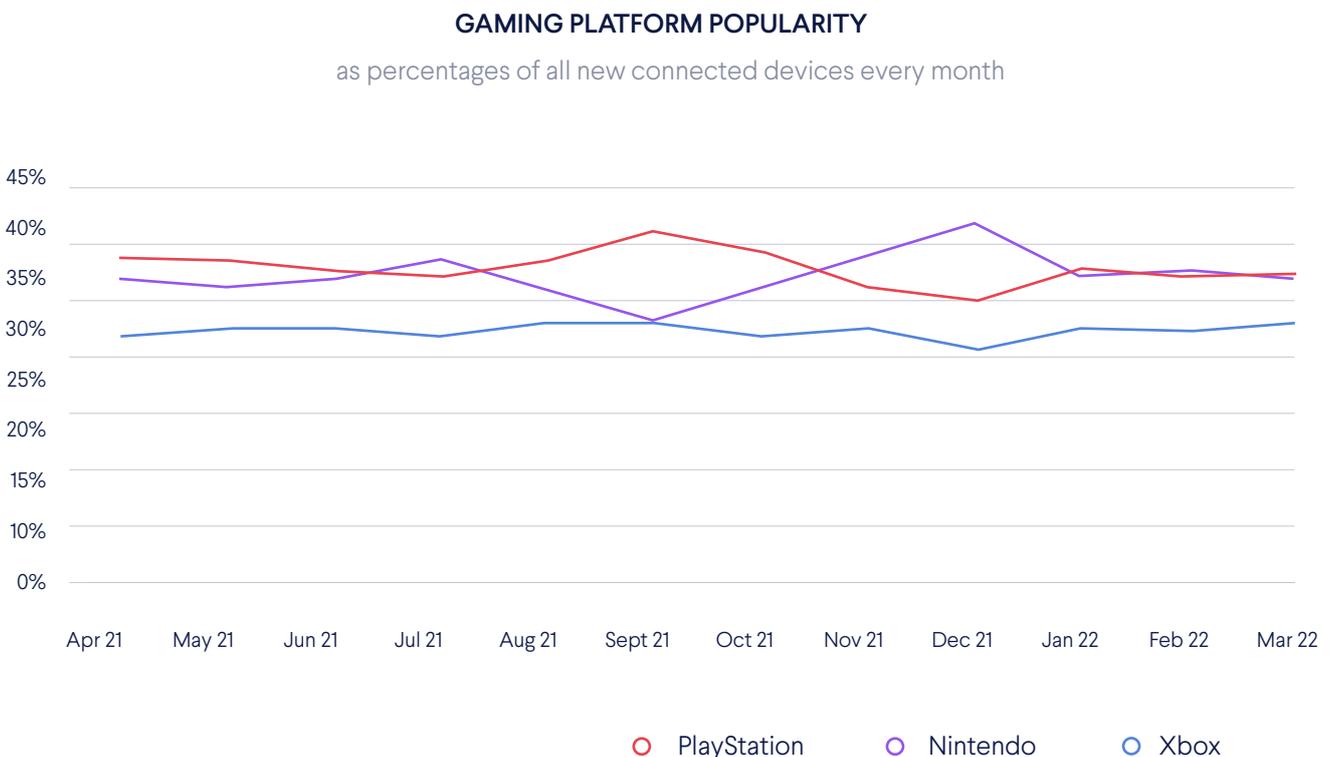


## The Most Popular Entertainment Devices: Game Consoles

Gaming consoles are very popular connected devices and have, perhaps, the healthiest competitive ecosystem, where three brands (Sony, Microsoft and Nintendo) have similar shares of the market.

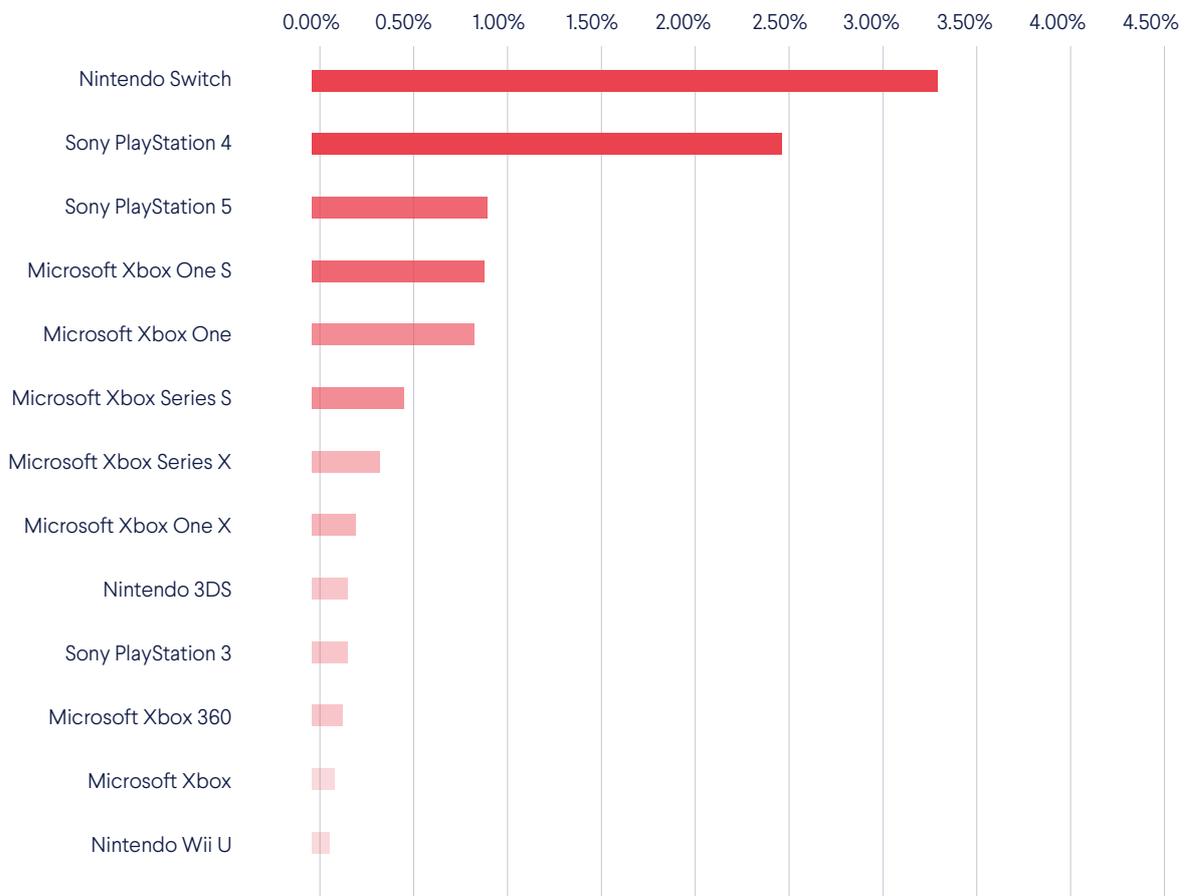


Perhaps most surprising is Nintendo's razor-thin lead in the market, which we noted in last year's report. It seems that PlayStation's availability issues still prevent many gamers from buying their newest console.



Nintendo has taken the lead during the holiday season, beating both Xbox and PlayStation in new devices. Nintendo Switch is hands-down the most used game console, while Sony's PlayStation 4 and 5 are in second and third place, respectively. Again, PlayStation 5's availability issues seem to have prevented it from becoming more widespread.

### MOST POPULAR GAMING CONSOLES



Interestingly, legacy game consoles such as the PS3, Xbox and Nintendo Wii U are still being used in small but significant numbers.

Our data also shows that **25.27% of households have at least two consoles from different brands**, indicating that a quarter of gamers do not stick to a single brand.

# The Smart Home

# The Smart Home

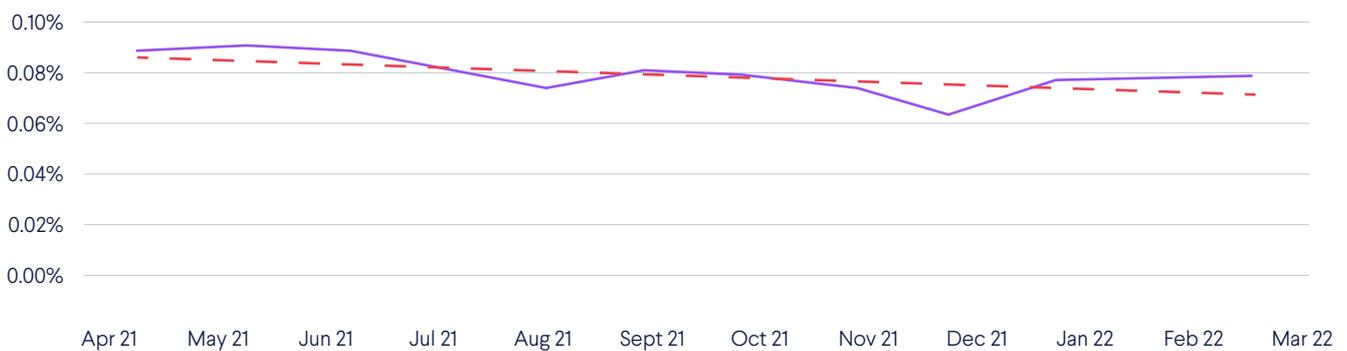
This year, we decided to take a closer look inside the smart home ecosystem and see which IoT devices and smart appliances are gaining traction and popularity.

First, we examine the smart home automation systems, which might seem highly niche in the overall scale of connected devices. Yet these devices should be seen more as the consumer-facing enablers of home automation: a single IoT hub might empower dozens of sensors, cameras, thermostats, lighting and other solutions at home.

Our data shows that smart home automation devices had a decline in relative popularity during the holiday season compared to other devices. Nevertheless, they still make up an average 0.08% of all new devices coming online every month.

We have added a trendline to the following graph to show a decline in the popularity of these devices. A probable cause of this is the fragmentation of the IoT device ecosystem and the vendors' reliance on cloud services to manage IoT devices. It is still anyone's guess whether this decline will continue or if we will see a new automation product sweep the market.

**SMART HOME AUTOMATION POPULARITY**



## Energy

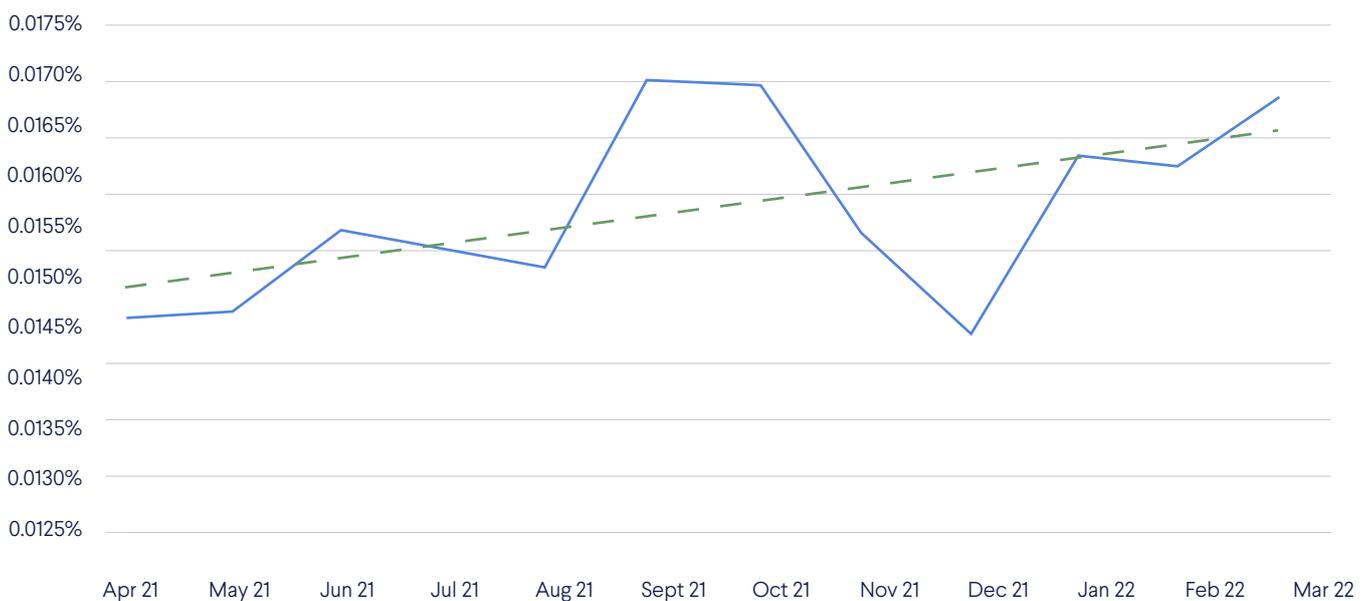
This year, smart lighting solutions and outlets were quite popular during the holiday season, which is why we chose to overview a group of energy-related devices and see which smart solutions consumers are leaning toward in the face of higher energy costs and environmental impacts of energy consumption.

## Energy Management Devices

Energy management is becoming a key consumer concern, and we see a growing trend of popularity in energy management devices, around 10% annually. Note that the relative decline in November and December is a factor of the holiday season, where consumers connected around 50% more devices.

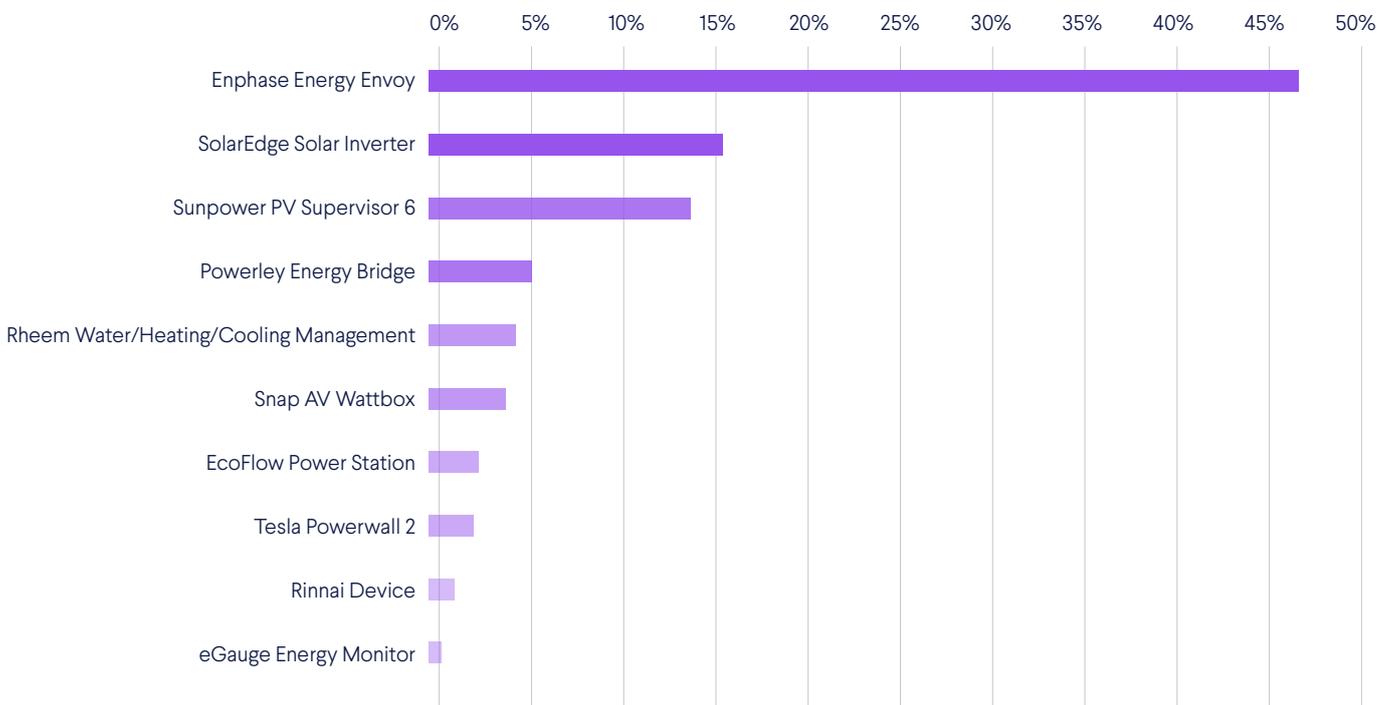
We have also added a trendline to the following graph to expose the growing popularity of this category.

**ENERGY MANAGEMENT DEVICE POPULARITY**



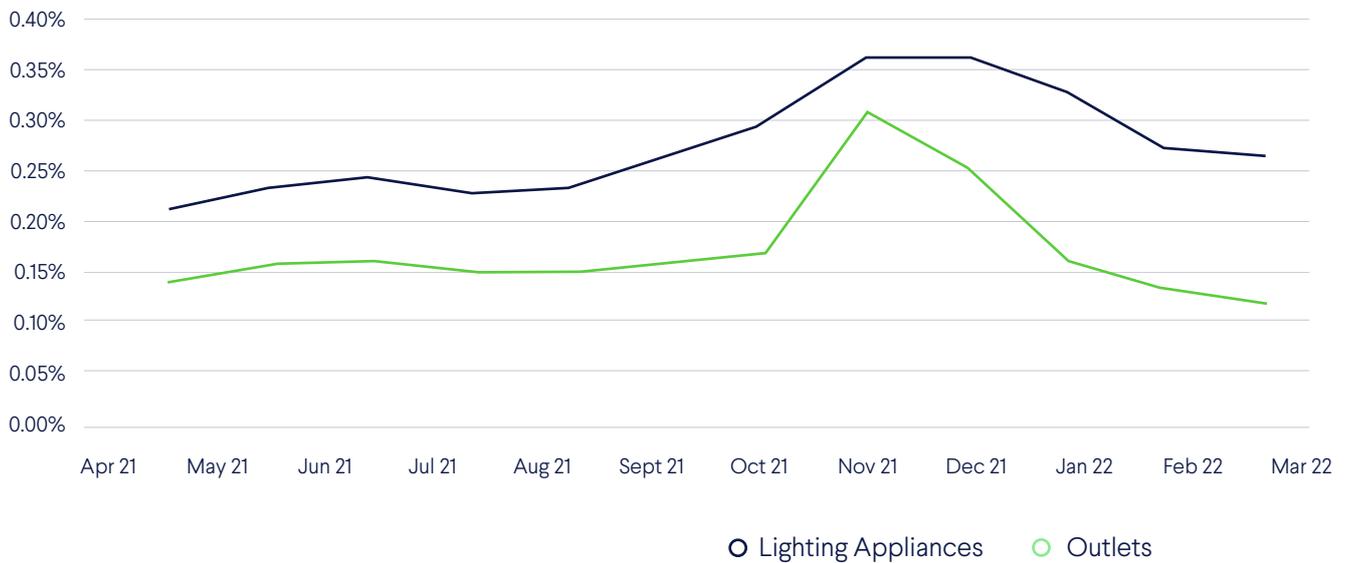
Quite a few brands are active in the energy management device space, with Enphase leading the ecosystem (46%). Nevertheless, we expect this category of devices to grow as more consumers set up solar batteries, electric car chargers and other energy management equipment in their homes.

### TOP 10 MOST POPULAR ENERGY MANAGEMENT SOLUTIONS



## Outlets and Lighting Appliances

POPULARITY OF LIGHTING APPLIANCES AND SMART OUTLETS

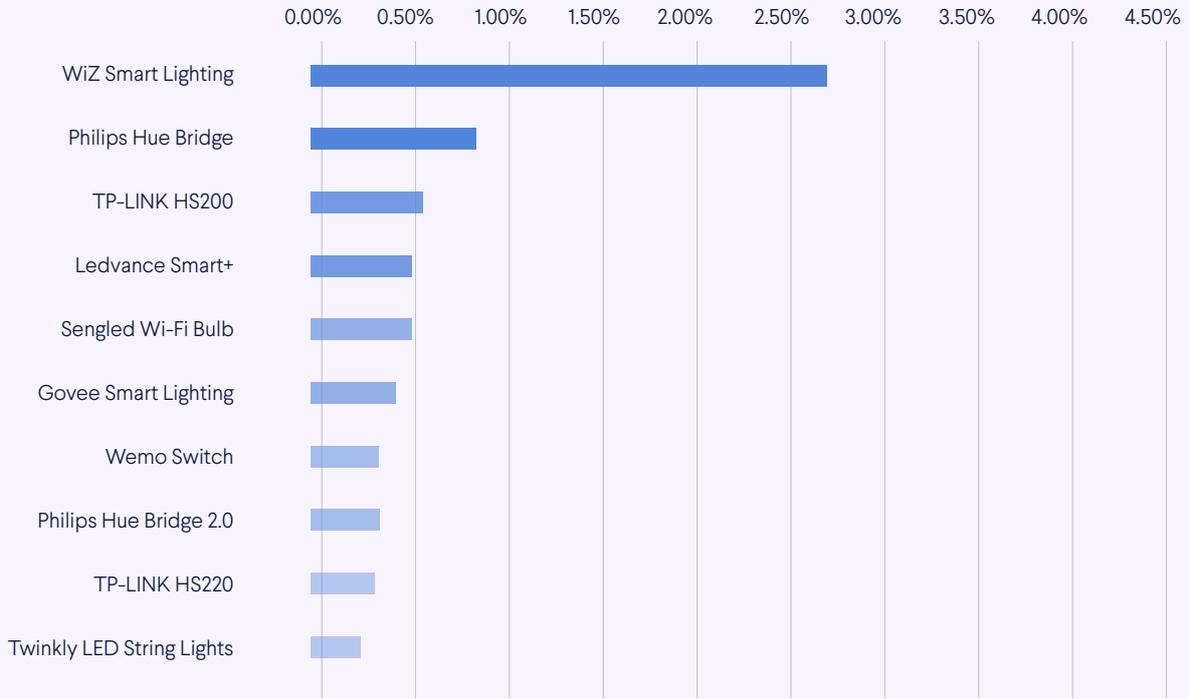


While smart lighting solutions, outlets and plugs might seem niche to many, there already are tens of millions of such devices in use. Their recent spike in popularity during the holiday season might indicate a growing consumer desire for better energy consumption in the home. It will be an interesting area to follow in the coming years.

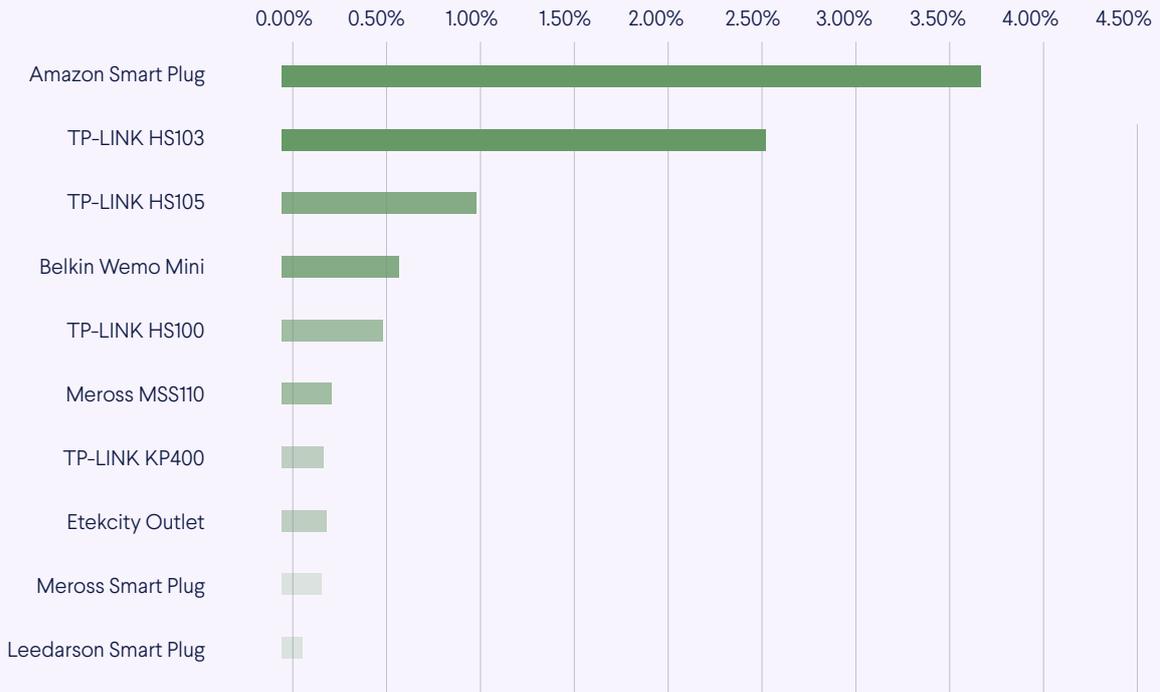


As for the ecosystem, there are quite a few brands in the smart lighting space. Amazon's smart plug is leading among the smart outlets, with TP-LINK also showing strong numbers with several of its models.

**TOP 10 MOST POPULAR SMART LIGHTING DEVICES**



**TOP 10 SMART OUTLET MODELS**



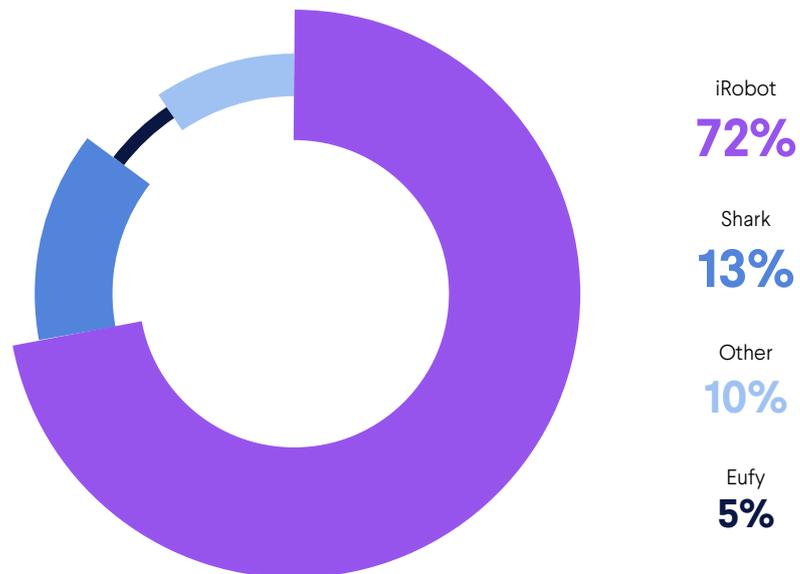
## Inside the Home: IoT Appliances

Some Internet of Things appliances and gadgets are becoming everyday household items. This year, we decided to take a look at four, robots, kitchen appliances, baby monitors and thermostats, to determine which vendors have the most popular products in each category.

### Robots

Vacuum cleaners and other robots are quite popular holiday purchases, and iRobot, the maker of the Roomba, is dominating the space with over 72% of robots in use.

MOST POPULAR HOME ROBOT BRANDS



## Kitchen Appliances

Almost all household appliance brands have smart devices on offer, yet GE has a major footprint in North America with 44% of all connected kitchen appliances. Samsung has 15%, while Thermomix, the apparently very popular multicooker maker, is at 12%.

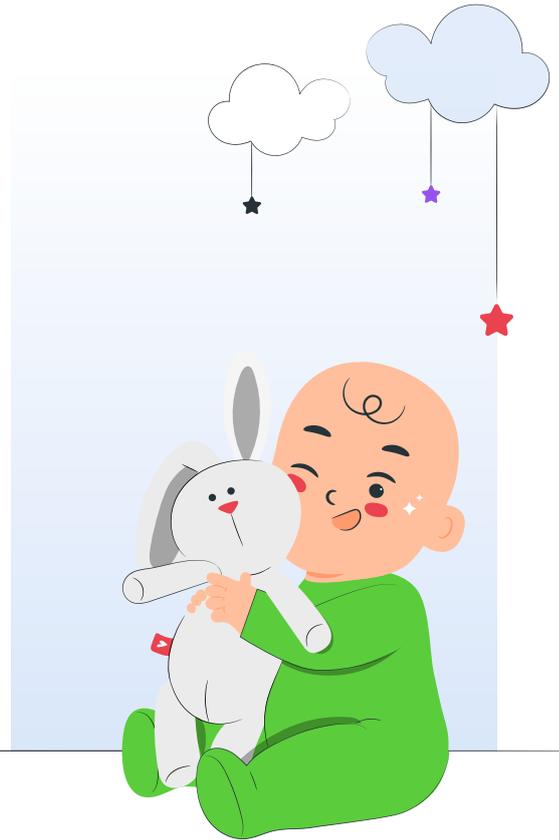
### TOP SMART KITCHEN APPLIANCE BRANDS

GE 44%  
Samsung 15%  
Thermomix 12%  
Whirlpool 8%  
Anova 8%  
Other 5%  
Bosch 4%  
Thermador 2%  
Rotimatic 1%

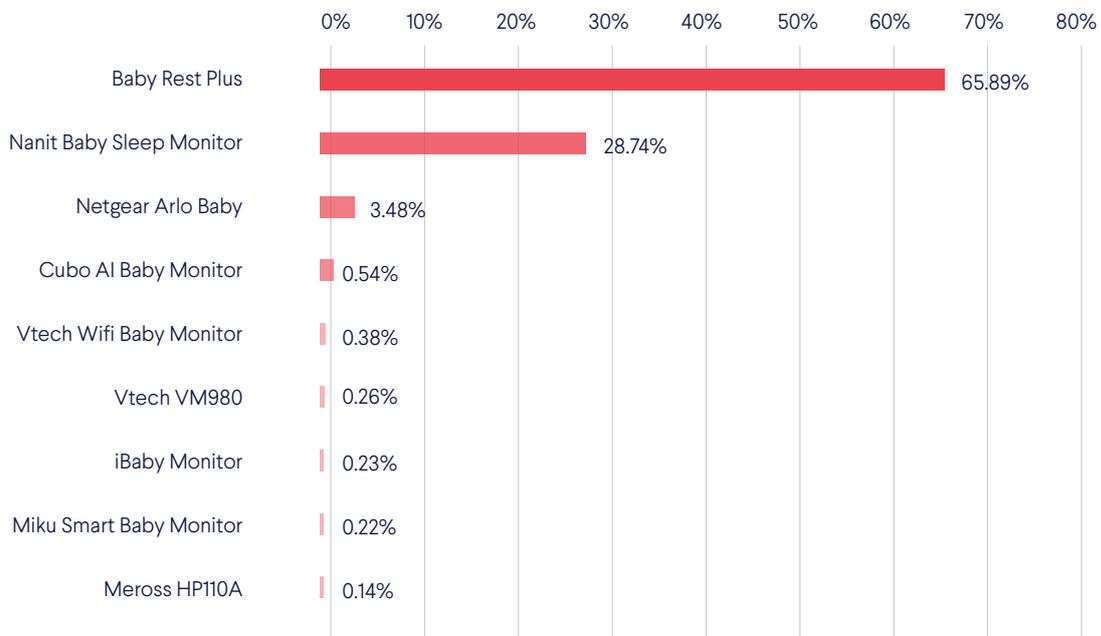


# Baby Monitors

Baby monitors are some of the most popular connected devices during the holidays, and two brands dominate this space: Hatch and Nanit, cornering 65.8% and 28.7% of the market, respectively.



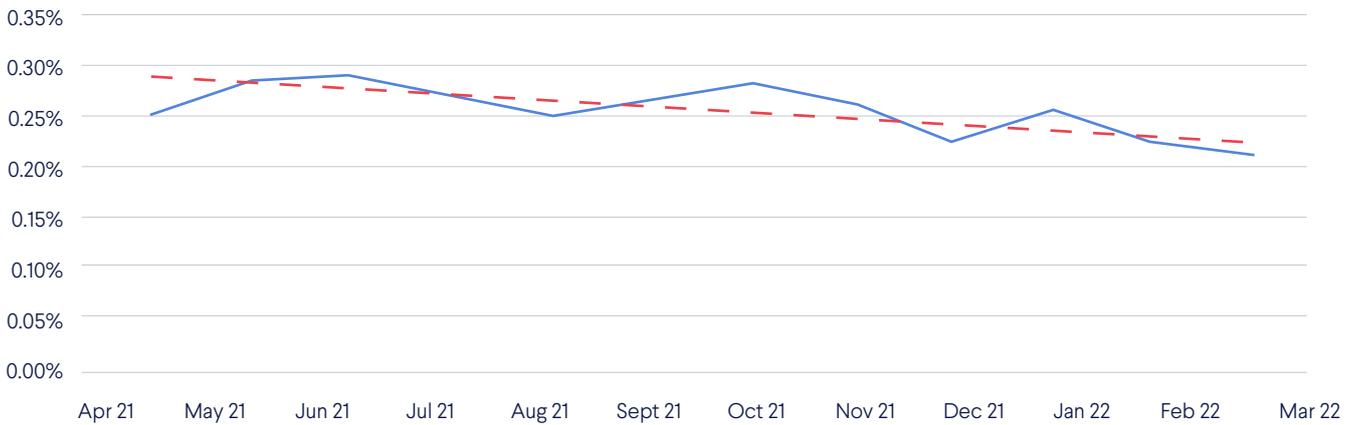
**MOST POPULAR BABY MONITOR BRANDS**



# Thermostats

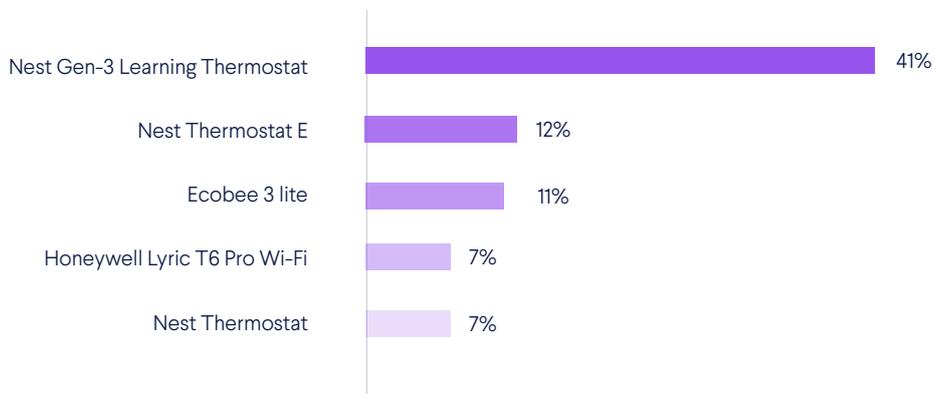
A key feature of the smart home, the connected thermostat has been one of the few smart devices to decline in relative popularity last year.

**THERMOSTAT POPULARITY**



Google's Nest thermostats are some of the most popular, holding over 60% of the smart thermostat market, with Honeywell (7%) and ecobee (11%) also having notable presence.

**TOP 5 SMART THERMOSTAT MODELS**

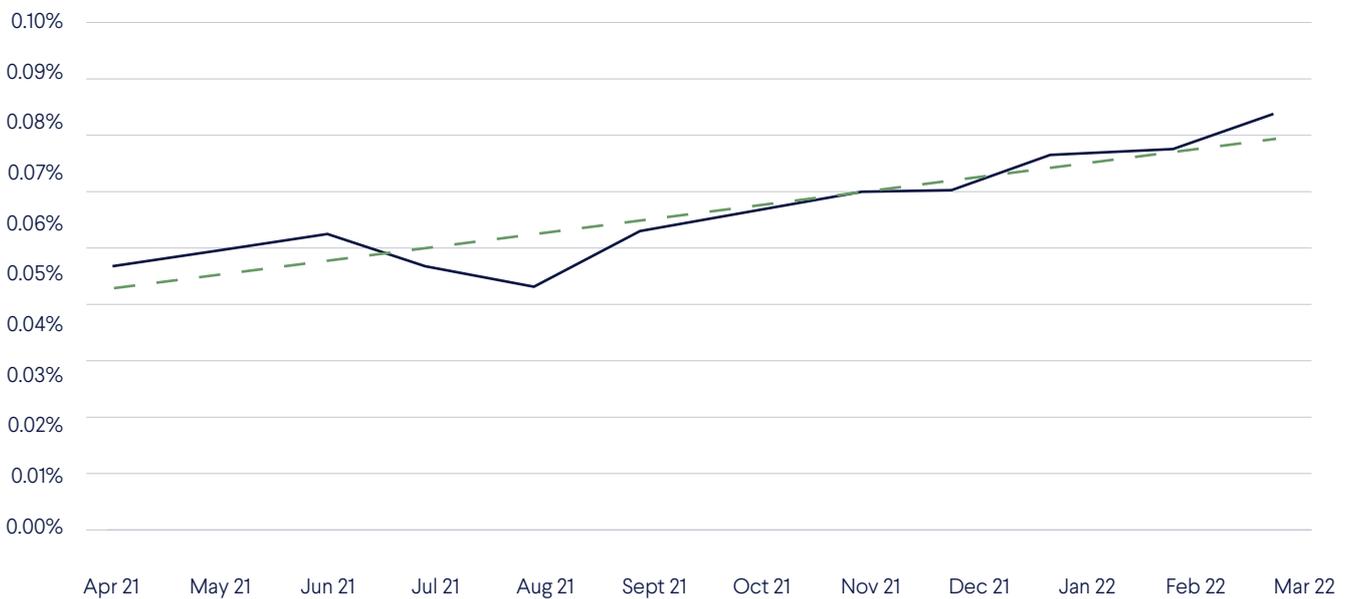


## In the Garage: Connected Cars Gaining Speed

In the garage, more and more automobiles are arriving with connectivity. Throughout the year, connected cars have gained around 25% more popularity in relation to other connected devices.

### POPULAR DEVICES

as percentages of all new connected devices every month



Two brands continue to dominate in North America: Ford and Tesla. The Android-based ATOTO car multimedia systems are also quite popular, likely used to upgrade older cars.



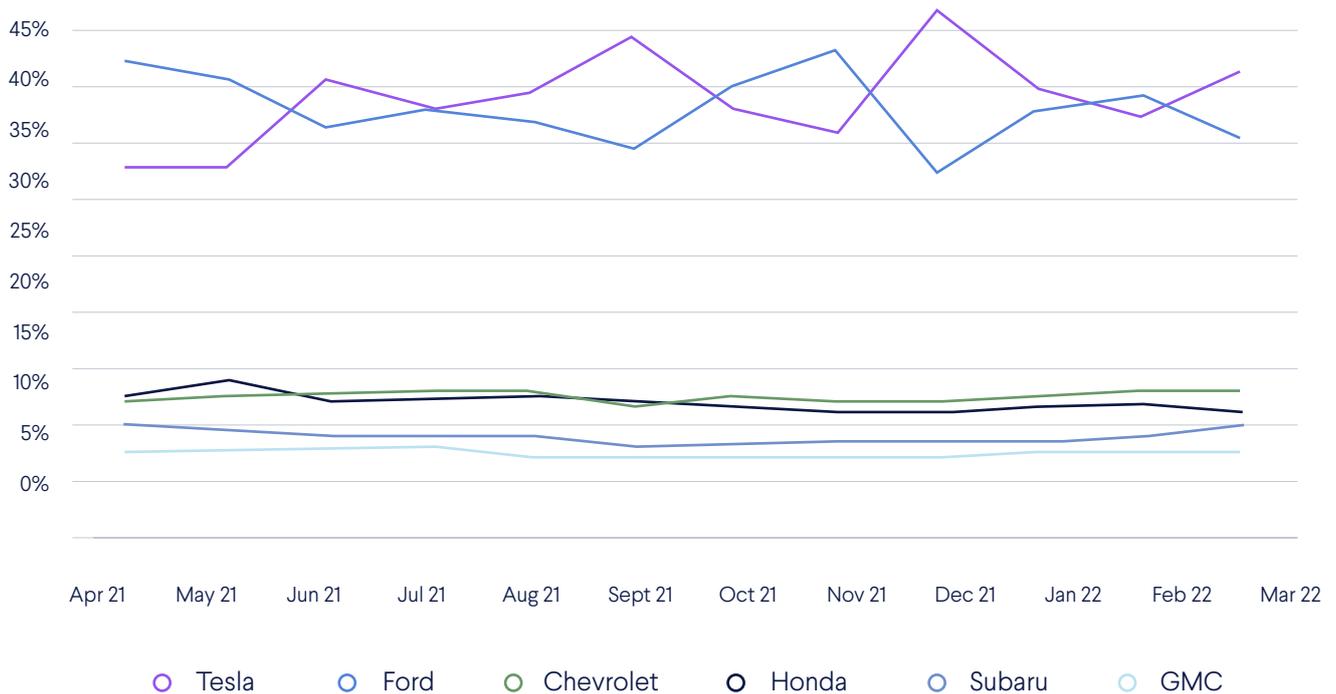
### CONNECTED CARS

|            |            |            |                      |
|------------|------------|------------|----------------------|
| Tesla      | Ford       | ATOTO      | Chevrolet            |
| <b>32%</b> | <b>31%</b> | <b>11%</b> | <b>7%</b>            |
| Honda      | Subaru     | GMC        | Other Car Multimedia |
| <b>7%</b>  | <b>4%</b>  | <b>3%</b>  | <b>5%</b>            |

The competition between Ford and Tesla is quite volatile, with both sharing the top position throughout the year. Tesla's delivery schedules might have a bit of an impact on the exact months when more of the manufacturer's vehicles go online. Chevrolet has had a slight upward trend in popularity.

### MOST POPULAR CONNECTED CAR BRANDS

as percentages of all new connected cars every month



Smart cars are undergoing an interesting evolution. We may soon see new cars with discounts offered for sharing telemetry data (speed, acceleration, location). Some carmakers already offer software-only updates and features.

While it is not clear if we'll see seat heating offered as a subscription soon, some manufacturers are already releasing automobiles that can be blocked remotely, e.g., for not making a loan payment on time. Like any other connected system, such things can be hacked and abused by malicious actors.



**Zoltán Balázs**

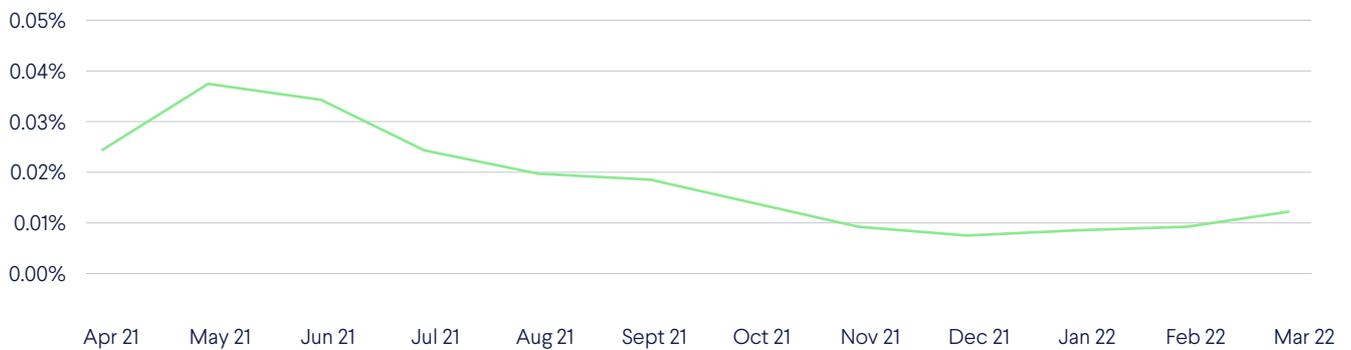
Head of Vulnerability  
Research Lab  
CUJO AI

## In the Yard: Smart Sprinkler Systems

Smart sprinkler systems are perhaps the most seasonal IoT devices, evidenced by the annual rise and fall in popularity, culminating in May–June and reaching the bottom in December.

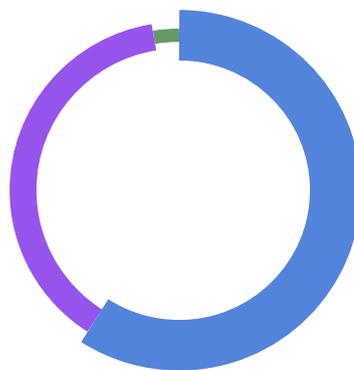
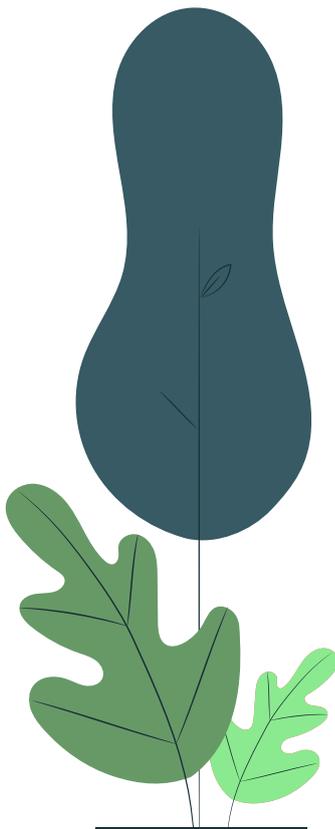
### SPRINKLER SYSTEM POPULARITY

as percentages of all new connected devices every month



With droughts threatening more regions, smart sprinkler systems might be a preferred solution for water conservation for some consumers. Two manufacturers are dominating this space: Rachio and Orbit.

### MOST POPULAR SMART SPRINKLER BRANDS



Orbit  
**59.57%**

Rachio  
**37.79%**

Other  
**2.64%**

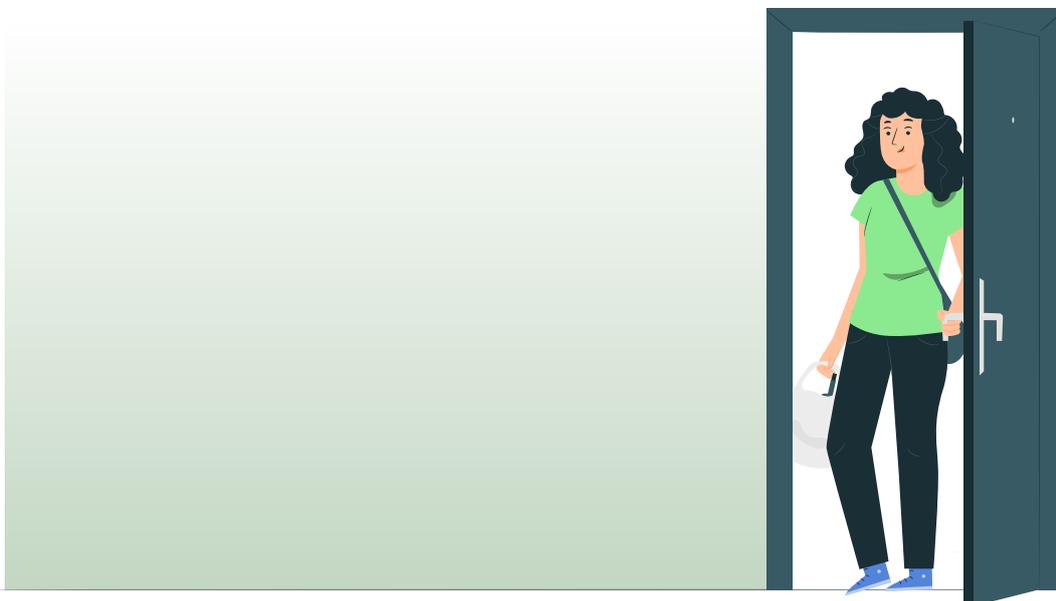
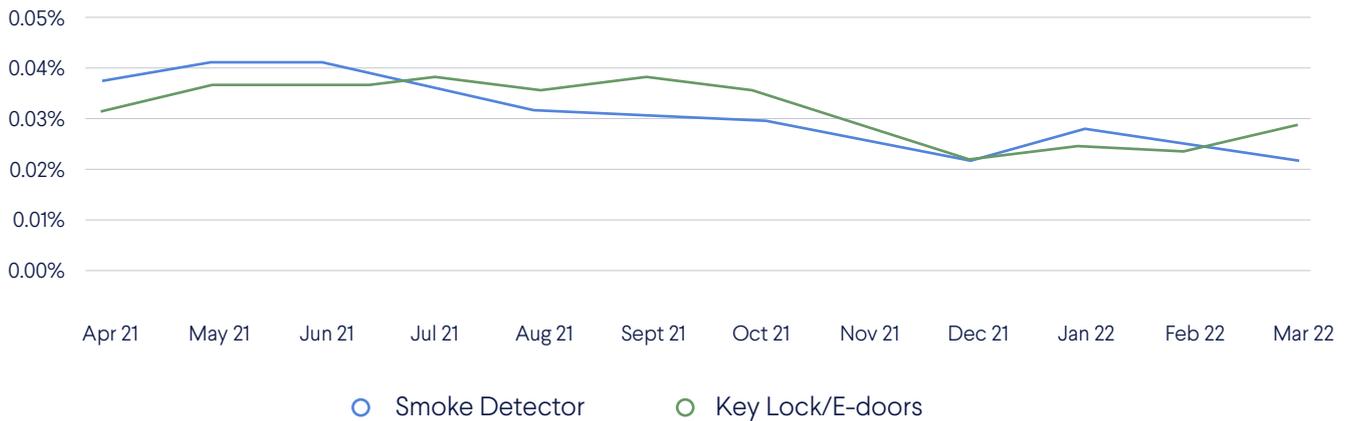


# Home Safety, Audio, and Printers Declining in Popularity?

Several device categories related to safety show downward trends, namely alarm systems, smoke detectors and smart doors/locks.

## POPULARITY OF SMOKE DETECTORS AND SMART DOORS/LOCKS

as percentages of all new connected devices every month



### POPULARITY OF ALARM SYSTEMS

as percentages of all new connected devices every month



Some home entertainment devices, such as set-top boxes and wireless audio devices, are also declining in popularity.

### POPULARITY OF WIRELESS AUDIO DEVICES

as percentages of all new connected devices every month



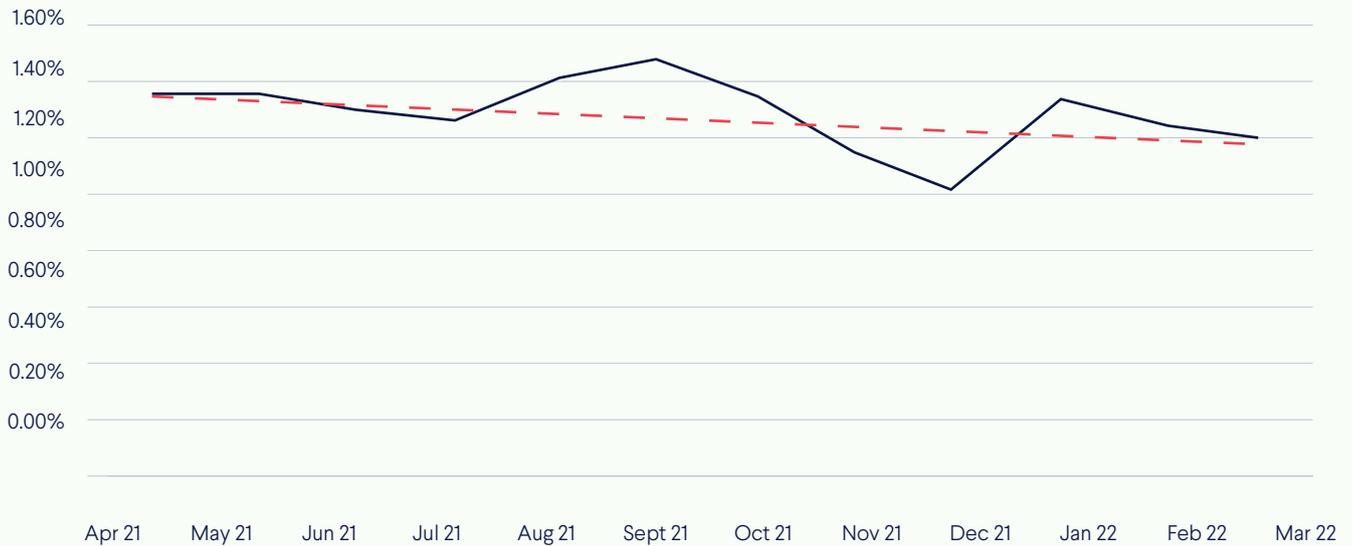
### POPULARITY OF SET-TOP BOXES

as percentages of all new connected devices every month



### PRINTER POPULARITY

as percentages of all new connected devices every month



Printers have remained a staple device, with over 1% of all newly connected devices every month. Nevertheless, they are declining in popularity and are bound to become more niche with time.

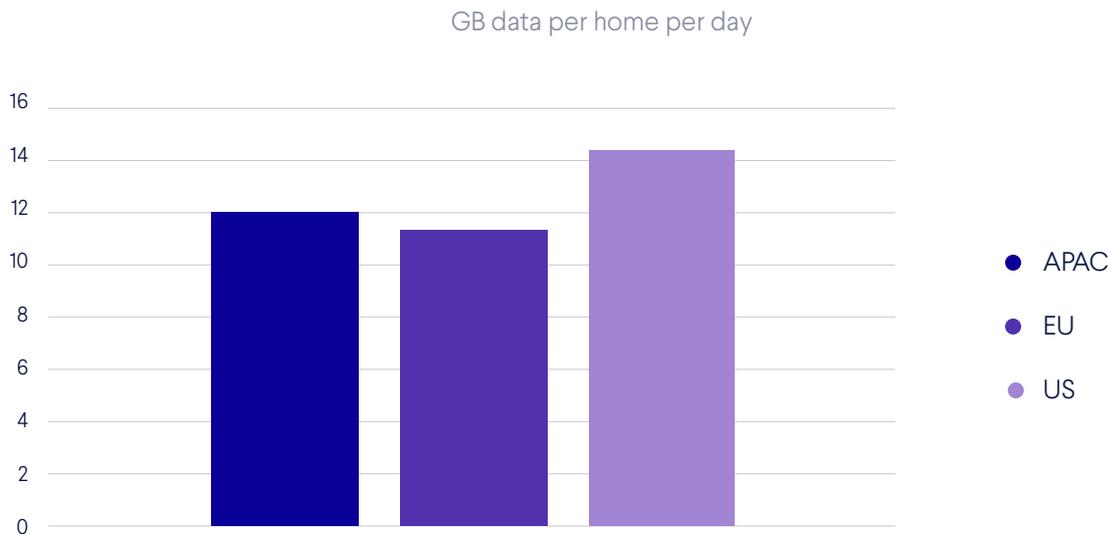


# Increasing Complexity of the Home Wi-Fi Network

# Increasing Complexity of the Home Wi-Fi Network

Considering both the variety of connected devices in an average home and the volume of data being transferred, we can see that the pressures on today's home Wi-Fi networks call for a systematic and high-performance management system to optimize the experience for all users and all devices.

**AVERAGE VOLUME IN GB OF Wi-Fi DATA CONSUMPTION PER DAY PER HOME FOR ASIA\*, EUROPE AND NORTH AMERICA**



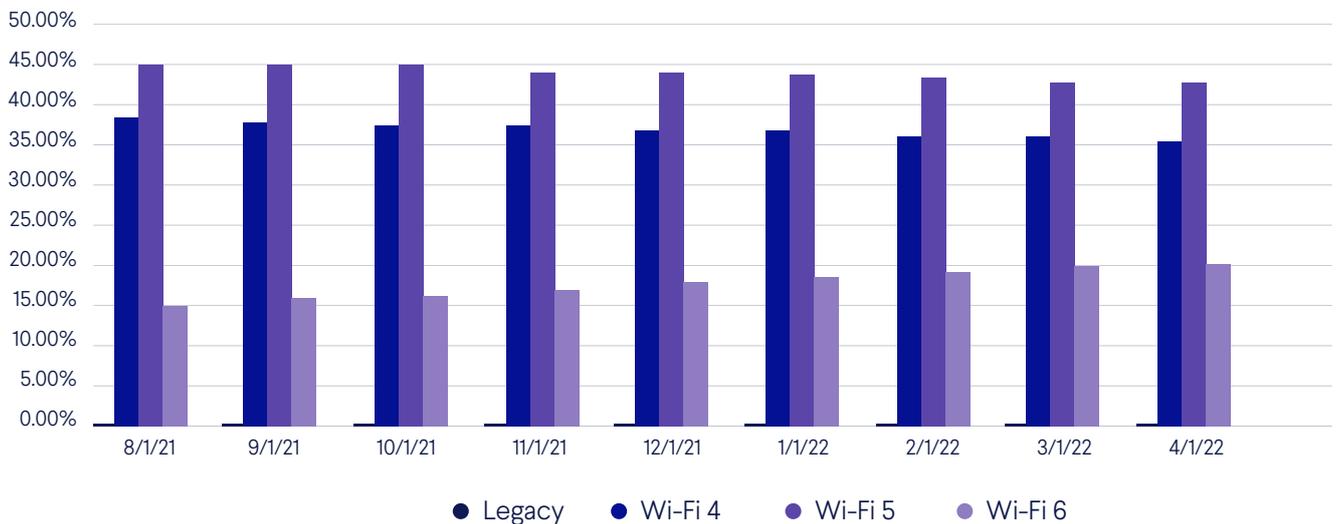
## Daily Volume of Wi-Fi Data Consumption per Home

For the regions covered here, we see that the North American market is leading on daily Wi-Fi consumption, with an average of 14.6 GB downloaded per home per day, which is more than 26% higher than in Europe (11.5 GB/day), with selected markets in Asia averaging at just over 12 GB per day.

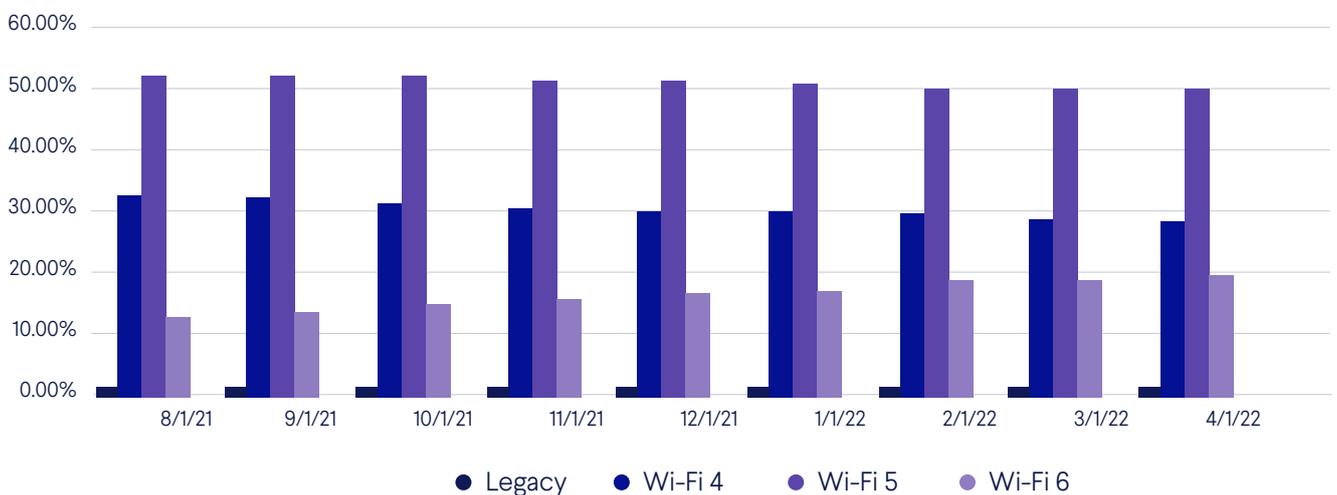
## Wi-Fi Technology Mix

Over time, we see an increasing complexity and range of the Wi-Fi technology of our connected devices. This snapshot of the European and North American markets shows that despite being introduced back in 2008, devices of the Wi-Fi 4 technology standard still represent over 35% of all connected devices in North America and 28% in Europe and there is a small percentage of even older legacy devices! The more recent generation devices (Wi-Fi 5, Wi-Fi 6/6E) and soon the latest standard (Wi-Fi 7) all have to connect to the same home Wi-Fi network as legacy devices—often printers, baby monitors and other devices that are not replaced as often as mobile phones or laptops—despite having very different capabilities. Managing this complexity is one of the key challenges for service providers and requires a robust cloud-based mechanism to ensure all devices get their fair share of Wi-Fi airtime.

EVOLUTION IN Wi-Fi TECHNOLOGY MIX FOR DEVICES IN NORTH AMERICA



EVOLUTION IN Wi-Fi TECHNOLOGY MIX FOR DEVICES IN EUROPE



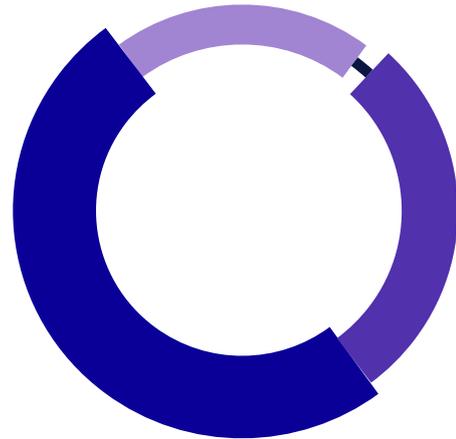
### Wi-Fi TECHNOLOGY MIX FOR DEVICES IN EUROPE TODAY

Legacy  
**1.405%**

Wi-Fi 5  
**50.20%**

Wi-Fi 4  
**28.20%**

Wi-Fi 6  
**20.20%**



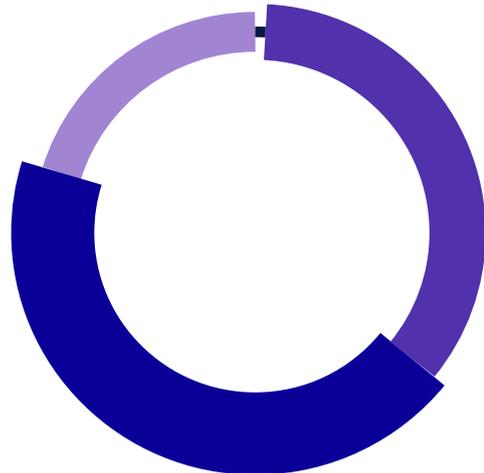
### Wi-Fi TECHNOLOGY MIX FOR DEVICES IN AMERICA TODAY

Legacy  
**0.5%**

Wi-Fi 5  
**42.8%**

Wi-Fi 4  
**35.7%**

Wi-Fi 6  
**20.5%**



The dependency on home connectivity has accelerated over the past two years and shows no signs of slowing. As our usage habits evolve (even more streaming, VR/AR, online gaming) and more devices connect, our home networks become highly complex environments that require careful management.



**Nicolas Fortineau**

CMO  
Airties

# Conclusion

# Conclusion

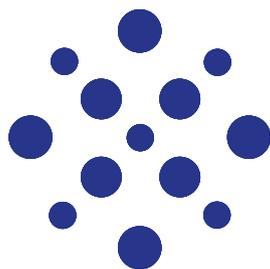
The connected device ecosystem is an ever-evolving space, with some devices gaining and losing popularity over time. This is evidenced by the relative increase of some entertainment systems (game consoles) and the decrease of others (wireless audio systems and set-top boxes).

As new combinations of connected devices and their use cases appear, there might be unforeseen risks and challenges for consumers and telecommunications operators to adapt.

This year's report showcased the importance of the holiday season for determining the outlook for the following year's device ecosystem, and we see that some parts of the IoT ecosystem have been gaining ground for several consecutive years.

Our previous device intelligence report has also showcased the need to be prepared for unforeseen events. Global events and trends impact connected households, as energy management and smart energy consumption devices gain a foothold in more homes.

Quite significantly, even though IoT devices such as smart robots and kitchen appliances are increasingly popular, the smart home automation systems are still encountered less often and are likely seen by consumers as challenging to use or manage. This might be a key area for network service operators to focus on, as IoT vendors offer fragmented, cloud-based options for device management.



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## About CUJO AI Labs

CUJO AI Labs is an advanced research department of CUJO AI specializing in IoT threat research and NSP customer cybersecurity. Labs researchers use the largest scale real-world device behavior database of over 1 billion anonymized consumer devices to empower advanced machine learning technologies that protect tens of millions of households around the globe. Every year, CUJO AI Labs publishes in-depth data-based reports, such as this one, on the IoT ecosystem and cybersecurity.

## About CUJO AI

CUJO AI provides advanced multilayered cybersecurity and network intelligence solutions for Internet service providers, which allows them to protect end users' devices and home networks. Major mobile and broadband providers partner with CUJO AI to offer security as a core service to their clients. Thanks to a unified approach that encompasses AI algorithms and an unmatched scale of its database, the company's products have a proven positive impact on their partner telecom revenue streams and customer retention. As the only comparative platform deployed to monitor over 1 billion devices, CUJO AI offers the most advanced AI algorithms to help its clients uncover previously unavailable insights about devices on their networks. Data processed by these algorithms is in full compliance with all privacy regulations.

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