The PET Paradox

How Amazon Instrumentalises PETs in Sidewalk to Entrench Its Infrastructural Power

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Background

Privacy Enhancing Technologies (PETs)

PETs (originally) aim to
alleviate power asymmetries by design

Minimising data processing/use to a purpose (purpose limitation)

Considering how powerful players may overreach (e.g. eavesdropping)

But… some contentious applications when applied by companies with infrastructural control

- Privacy Sandbox (Chrome)
- App Tracking Transparency (iOS)

- Google Apple Exposure Notification framework (Android, iOS)

Privacy Sandbox for the Web
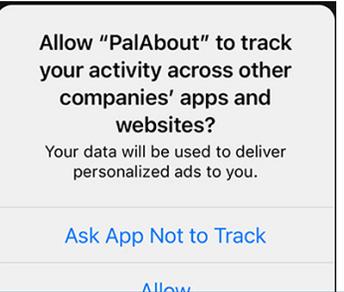
Privacy Sandbox for the Web will phase out third-party cookies and limit covert trac[...] creating new web standards, it will prov[...] publishers with safer alternatives to exis[...] technology, so they can continue buildin[...] businesses while your data stays private[...]

Allow "PalAbout" to track your activity across other companies' apps and websites?
Your data will be used to deliver personalized ads to you.

Ask App Not to Track

Allow

GOV·UK

Home > Competition and Markets Authority cases and projects

Investigation into Google's 'Privacy Sandbox' browser changes

The Competition and Markets Authority (CMA) investigated Google's proposals to remove third-party cookies (TPCs) on Chrome and replace TPCs functionality with a range of 'Privacy Sandbox' tools.

Apple | Google Exposure Notifications

➤Remain central to digital advertising

➤Increase their influence in public service delivery

But… some contentious applications when applied by companies with infrastructural control

Priv
for the Web

Privacy Sa
third-part
creating n
publishers
technolog
businesses

Your data will be used to deliver
personalized ads to you.

Notifications

Providing some privacy to users (B2C)

But entrenching their role in how other organisations produce and deliver services (B2B)
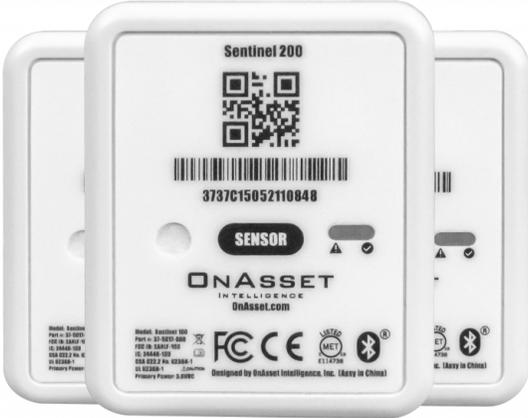
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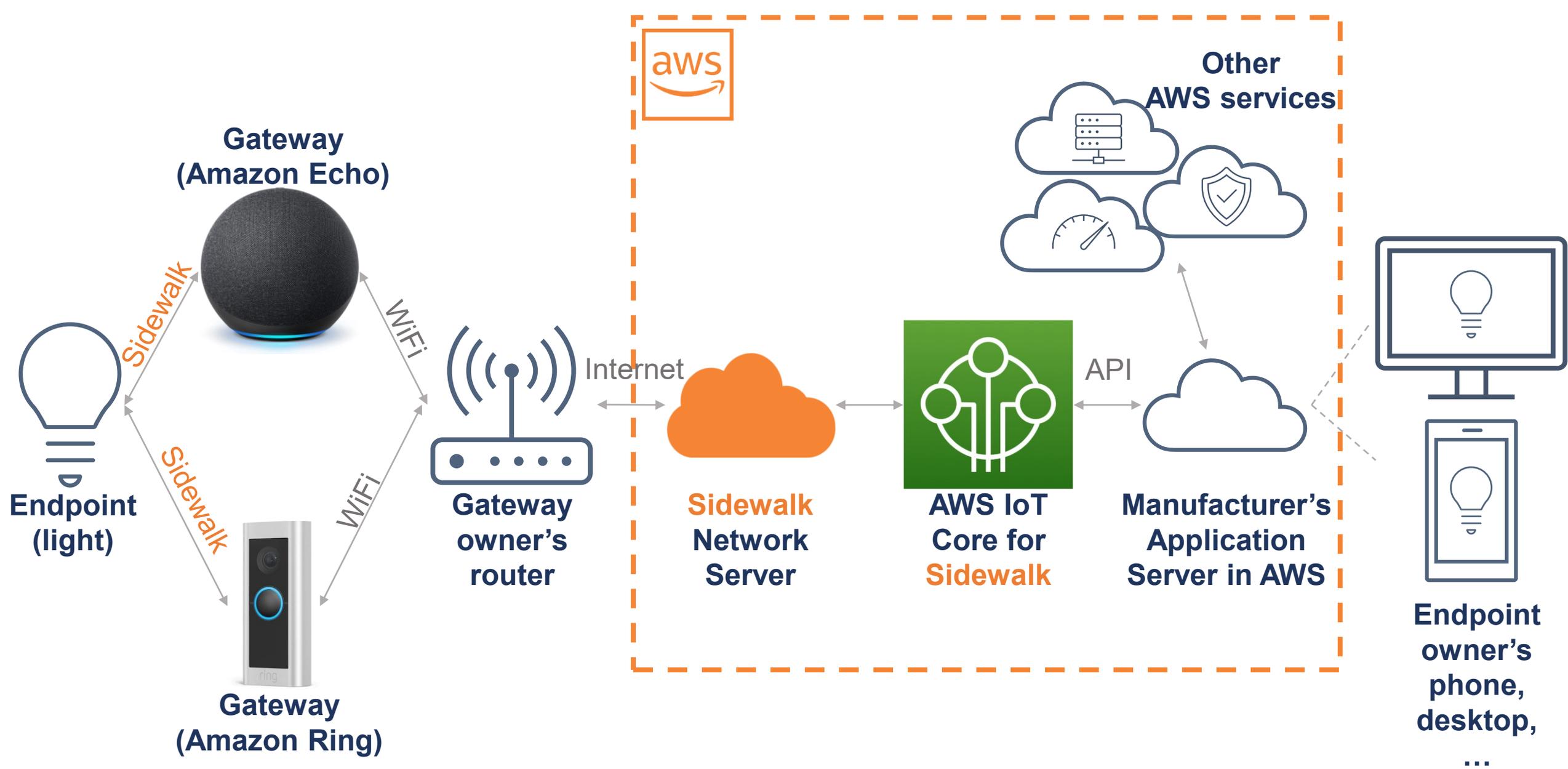
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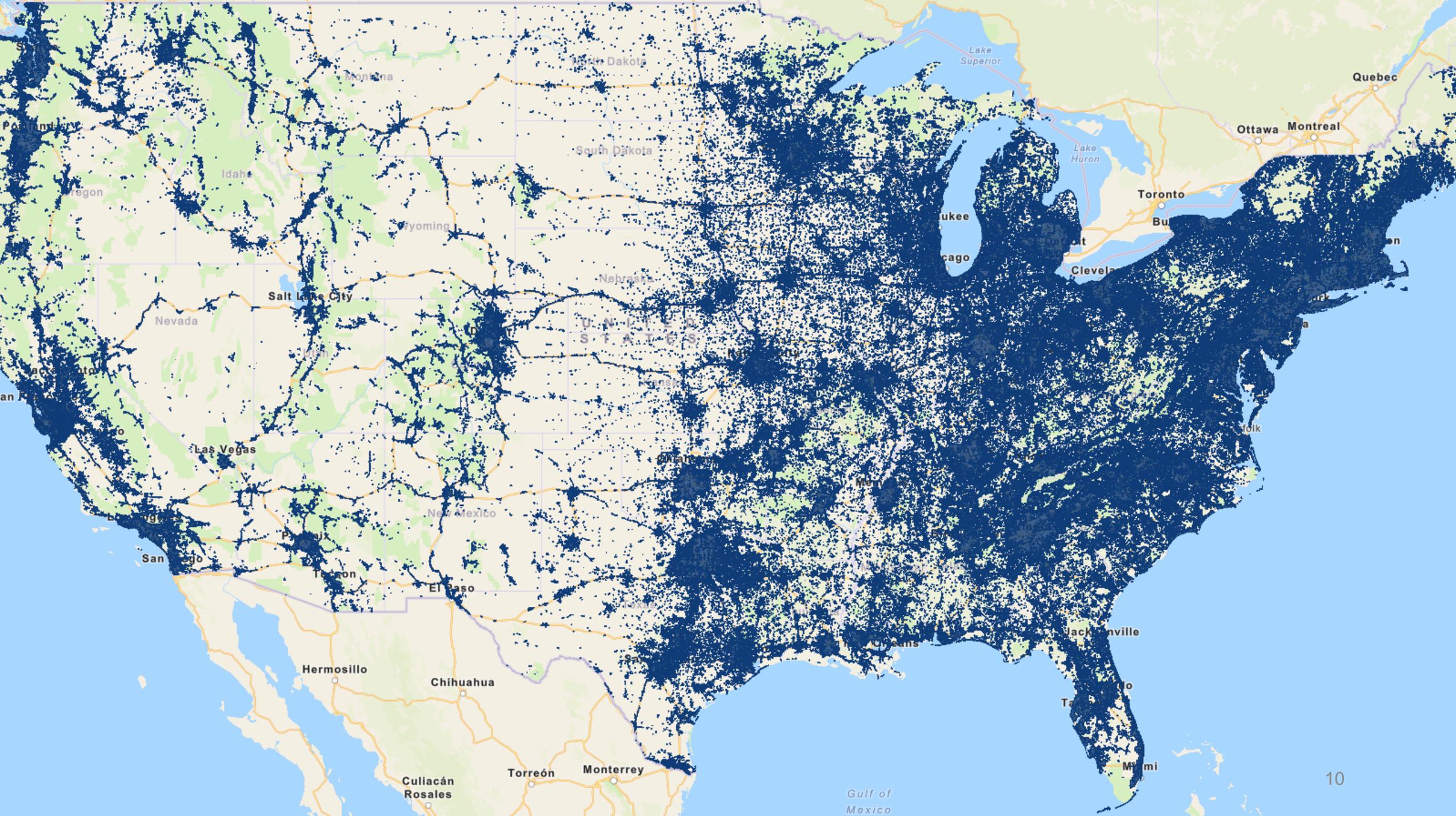
Case study: Amazon Sidewalk

Internet of Things (IoT) devices need connectivity

Gateway
(Amazon Echo)

Endpoint
(light)

Gateway
(Amazon Ring)

Sidewalk

Sidewalk

WiFi

WiFi

Gateway
owner's
router

Internet

Sidewalk
Network
Server

AWS IoT
Core for
Sidewalk

API

Manufacturer's
Application
Server in AWS

Other
AWS services

Endpoint
owner's
phone,
desktop,
…

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Qualitative case study

- Grey literature

- Technical documentation

- Interviewed 8/16 adopting IoT manufacturers

Effects of PETs in Sidewalk

Public reception

The Washington Post
Democracy Dies in Darkness

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CONSUMER TECH

Amazon may be sharing your Internet connection with neighbors. Here's how to turn it off.

You have no control over what sort of data flows over Amazon's new Sidewalk wireless network, which has been lying do... Ring cameras ... until now

Perspective by Geoffrey A. Fowler
Columnist | + Follow

June 8, 2021 at 11:07 a.m. EDT

PC #BestBrandsoftheYear #GetOrganizedin2024 Best Products Reviews How-To News Deals Newsletters

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What Is Amazon Sidewalk and How Do You Disable It?

Amazon is automatically activating a network sharing feature for most of the devices it sells. Here's why you may not want it, and how to opt out of Amazon Sidewalk.

By Eric Griffith   Updated June 8, 2021   ...

WIRED

DAVID NIELD   GEAR   MAY 11, 2021 3:18 PM

How Amazon Sidewalk Works—and Why You May Want to Turn It Off

It promises connected convenience. But the ecommerce giant doesn't exactly have an inspiring record when it comes to privacy.

The Verge / Tech / Reviews / Sci

TECH / HOW TO / AMAZON

How to opt out of (or into) Amazon's Sidewalk network / The new network will share a small portion of your bandwidth with your neighbors

By Barbara Krasnoff, a reviews editor who manages how-tos. She's worked as an editor and writer for almost 40 years. Previously, she was a senior reviews editor for Computerworld.

Jun 1, 2021, 9:35 PM GMT+2

TechHive

UPDATED

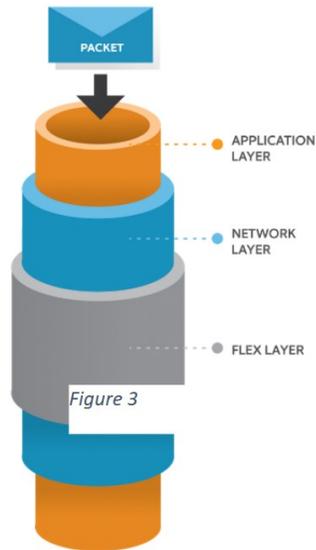## Welcome to Amazon Sidewalk! Now here's how to turn it off

Your Amazon Echo speakers and Ring devices may already be enabled to join Amazon's new, neighborhood-wide Sidewalk network, but you can turn Sidewalk access off using a single setting.
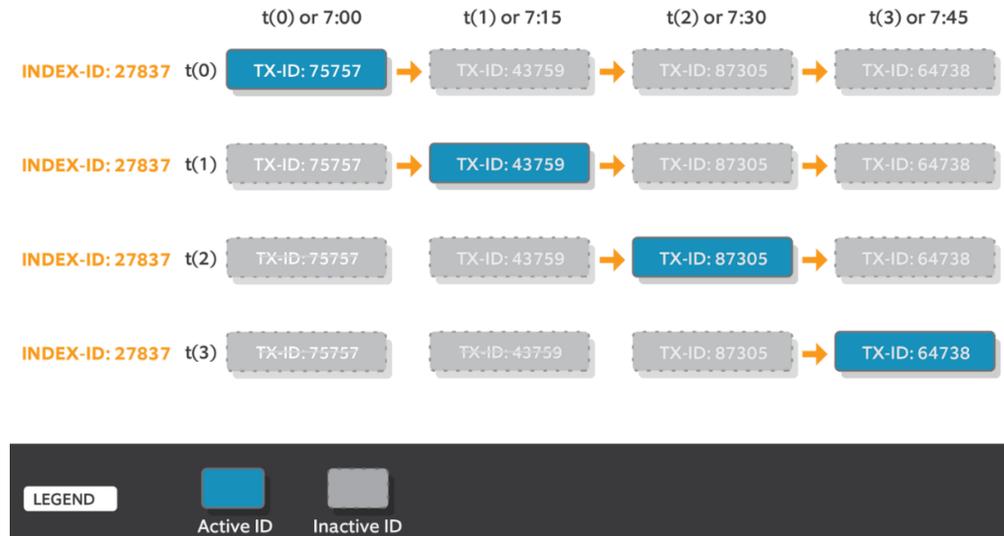
By Ben Patterson

TechHive | JUN 2, 2021 3:00 AM PDT

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PETs in Sidewalk

3-layered end-to-end encryption scheme

Figure 3

Obfuscating identifiers and routing information

- Gateway owners *"do not receive any information about devices owned by others connected to Sidewalk"*
- *"Information [endpoint] customers would deem sensitive, like the contents of a packet sent over [Sidewalk]"* not visible to Amazon or gateway owners

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!

Many privacy and confidentiality issues remain

●

But we focus on B2B

Requirements for IoT manufacturers (B2B)

"Key" endpoints

- *"affect[ing] the actual physical production, **quite severely**. … They have very high standards on how they actually get keys into devices"*
- *"a **big change**. It's a big step up in security … it will take some while to get the production of this up"*

Amazon-approved chips and expensive hardware

- *"not a perfect fit for us"*

Certification and auditing processes

- *"they audited the company, they audited the objectives of the company ... how we were being financed, to determine if we're going to be around for a while"*

Use AWS

- *"there's **no option for the data not going to AWS**"*
- *"if a [customer] wanted to use Azure, then we could just get the data to Azure", but "there's still a **copy and paste effort**"*

The PET Paradox

Facet 1: Flipping & informational power (B2C)

- PETs let Amazon exercise granular control over data flows, enabling:
  - Communication with endpoints
  - Device telemetry (for Amazon and manufacturers)
    - *"power usage, connectivity usage, and data transfer" patterns*
  - AWS usage by IoT manufacturers
    - *"Amazon, with AWS in particular, ... did a great job of **seeing what customers were doing with their products** and introducing new services that better met those needs … To what extent are they doing that with Sidewalk? I honestly don't know. But I'm sure they are."*
- Extending their computational infrastructure
  - **AWS + Echo/Ring + third-party endpoints**
- Marketing strategy
  - PETs as necessary and sufficient solutions to suppress some data flows, so that consumer devices can be repurposed for novel services ("**flipped**")

➢Conceals how PETs increase **informational power**, rather than counter it!

Facet 2: Infrastructural power over IoT manufacturers (B2B)

Amazon not only sets specifications, but stipulates workflows

Incentivises pulling more (software) production into AWS	**Centralises Amazon's technologies and governance**	**Creates technical and organisational path dependencies**	**Provides Amazon with business-sensitive information**
	• Endpoint hardware, firmware, provisioning, patching • Certification • Abuse prevention, network availability • Myriad of cloud services	• *"[... Amazon] could just say "forget it" … if you based your whole company around that, that's a bad spot to be in."* • *"it becomes a 'portfolio management' kind of thing"*	• *"In the end there's not a whole lot we can do about it, you know, aside from government action or lawsuits"*

Infrastructural power: Entrenching Amazon's computational infrastructure (AWS + gateways) in how manufacturers produce devices and services

Power begets power

*"there's an aspect of an **ongoing partnership** with Amazon, which is a huge company"*

Sidewalk as *"stepping stone towards future development ... It can **create a more intimate relationship** with Amazon to wanna do future developments for [our company]. I would say that's probably the point"*

*"it's like **befriending the giant**, right? ... If we create a rocky relationship with them and shut them out, well, that's going to eliminate a huge portion that we could have for business with them. And we really aren't trying to create that kind of rough rockiness"*

*"There's always about, you know, who's holding the more power? ... We just kind of **play ball the way they play ball**, and hopefully develop an innovation that can drive the growth. That's all"*

Privacy protection rarely mentioned

The PET Paradox

PETs reach millions of users & manufacturers, but:

1. **Increase informational power asymmetries**

   - *People*: A connectivity network for monitoring the world
   - *Companies*: Providing Amazon valuable device and AWS usage information

2. **Enable infrastructural power**

   - Ability to reshape production processes, environments, etc. of other businesses
   - Using consumers' devices

Paths forward for this room

1. **Identify when repurposing consumer devices, with privacy guarantees, masks an extractive intervention**

- Flipping
- Economic and B2B implications

2. **Engage conversations across affected players / domains**

Competition	PETs / engineering
• Limit PETs for more competition and free markets… • Do the PETs solve existing issues (Sandbox), or prevent ones raised by the new service (Sidewalk)?	• Excited about uptake and engineering • Worried about *"privacy washing"*
	Consumer rights
	Governmental sovereignty
	…

➢Need more discussions uniting these angles

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