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The State of Device Management 2024

The Next Generation of Devices, Use Cases, and Management Practices

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Introduction

Welcome to the second annual State of Device Management report. How much difference does a year make? In this report, we'll take a look at the device management environment another year beyond a global pandemic which threw immense twists and turns into organizations' operational strategies and their use of devices for mission critical use cases.

Just like the inaugural report (2023), this research comprises data across over a thousand companies — from startups to enterprises, companies that manage their own devices to those who provide managed solutions for others — to better understand how devices are used and managed, and the direction the device management industry is moving.

Industries and solutions included in this research:
- ► **Hospitality:** Restaurants, hotels, entertainment venues
- ► **Healthcare:** Healthcare networks, healthcare facilities, pharmaceuticals, and other organizations that provide remote care or clinical trials
- ► **Retail:** Department stores, convenience stores, grocery stores, etc.
- ► **Logistics:** Transportation, supply chain, or fulfillment
- ► **Education / Nonprofit / Government:** Educational organizations, NGOs, or governmental entities
- ► **Software / IT Services:** Software or other IT service providers
- ► **Media / Telecommunications:** Media, digital signage, or telecommunications providers

Note from the author: As we tried to place companies in the industry buckets for analysis, we noticed that it was increasingly difficult to cleanly classify them. There are a number of device solutions that span Logistics and Retail, Media and Hospitality, Software / IT Services and everything. If you asked five people what any one company does, you will likely get at least three different answers. We did our best, but acknowledge this flaw in our industry breakdown.

There's been a wave of device OS updates, but many still lag behind.

Last year, the State of Device Management report found that nearly 95% of devices were not on the most three recent versions of Android, signaling a coming wave of updates. This year, 23.36% of Android devices captured in this research are running one of the latest three Android versions (12.x, 13.x, or 14.x). Notably, just under 14% are on Android 13, a significant gain year-over-year (5.34% in 2023).

Evolving your device fleet to more recent versions not only improves security — it also enhances your ability to innovate.

More devices are being locked down tight.

Nearly 4 out of every 10 devices covered in the research are configured to single-app kiosk mode, which is more than twice as many compared to 2023. Modern device use cases are increasingly "dedicated" or single-purpose. And with the ability to remotely reconfigure devices (such as updating the app in kiosk mode), putting a device in kiosk mode doesn't necessarily sacrifice flexibility. Many companies are also opting to use web applications — locking devices to a web browser and restricting which URLs are accessible — as another way to easily and flexibly control the user experience.
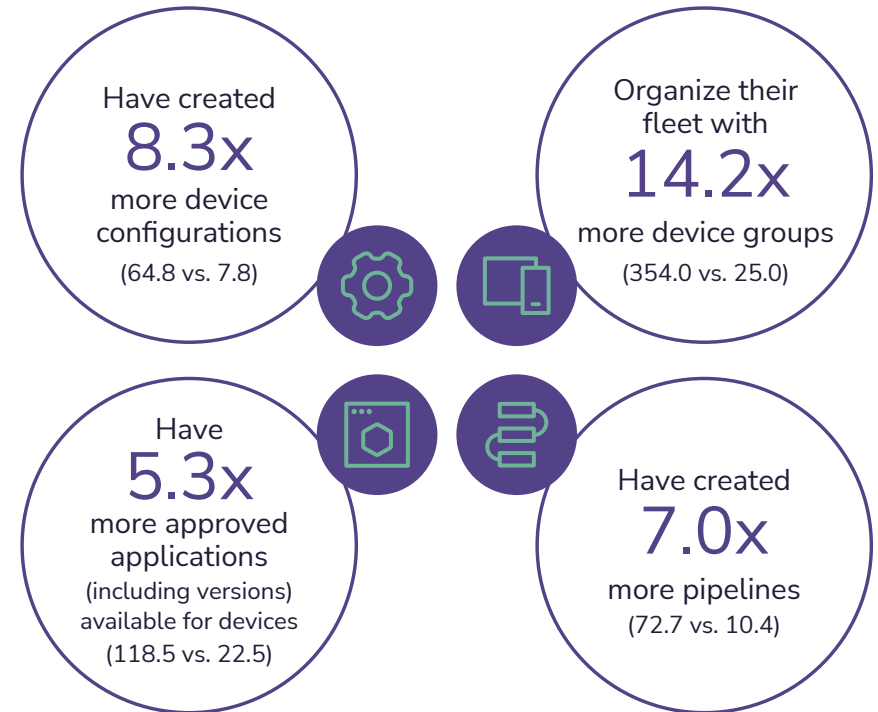
Software pipelines are in!

Across nearly every industry, the companies that are leveraging software pipelines to intelligently roll out software updates, are using more pipelines. This could hint at a growing maturation in how companies orchestrate releases — more testing, more validation, more groups, etc. On average, companies that use software pipelines have created 10.4 pipelines, more than twice as many compared to 2023. This leads us to the final key observation...

Or, the rich get richer?

The most mature organizations (by fleet size, users, advanced feature adoption, etc.) are doing way more with features available to them than the average. While that pattern is not totally surprising, the gap is...stark.

In an analysis of over 1,000 companies, compared to the average, the top 50 companies:

Have created **8.3x** more device configurations (64.8 vs. 7.8)

Organize their fleet with **14.2x** more device groups (354.0 vs. 25.0)

Have **5.3x** more approved applications (including versions) available for devices (118.5 vs. 22.5)

Have created **7.0x** more pipelines (72.7 vs. 10.4)

There's a potential gap emerging between the most cutting-edge, experienced device management experts and the middle majority. Where does your organization fit? Are you continuing to push ahead or do you need to quickly catch up?

What Does a Typical Device Fleet Look Like in 2024?

The average device fleet across the companies included in this research comprises 470 devices. On average, companies in the Media / Telecommunications industry manage the largest fleets (1.7K devices), followed by Hospitality / Restaurants (1.6K) and Healthcare (791). On the other hand, Other (100), Software / IT (158), and Logistics / Supply Chain (267) had the smallest average fleet sizes.

Average # of Devices Per Tenant

Industry	Average # of Devices
Hospitality/ Restaurants	1596.6
Retail	438
Healthcare	791.4
Media/ Telecommunications	1667.3
Education/ Non-Profit	398.9
Logistics/ Supply Chain	226.7
Software/ IT	158.3
Other	99.6

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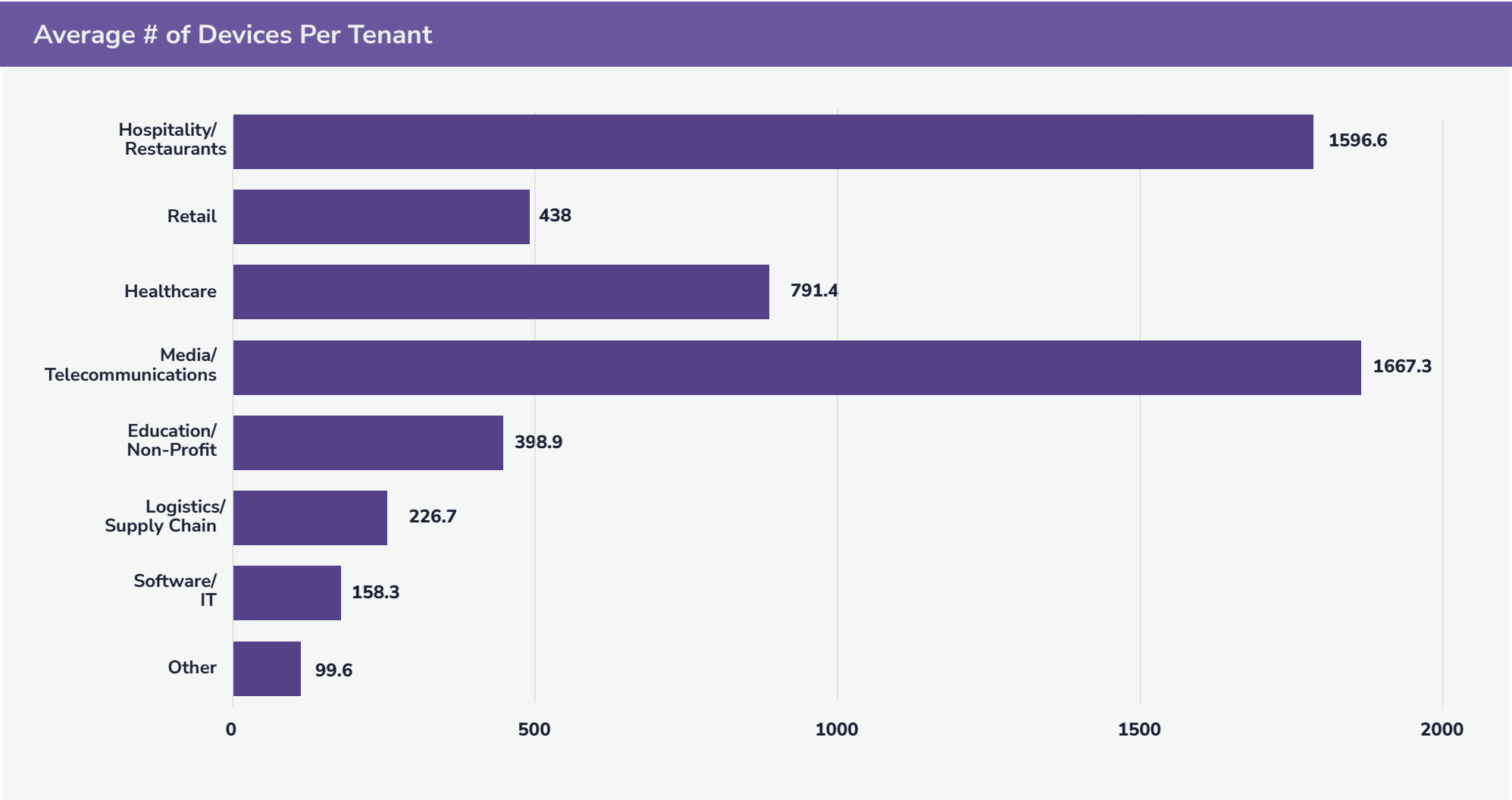
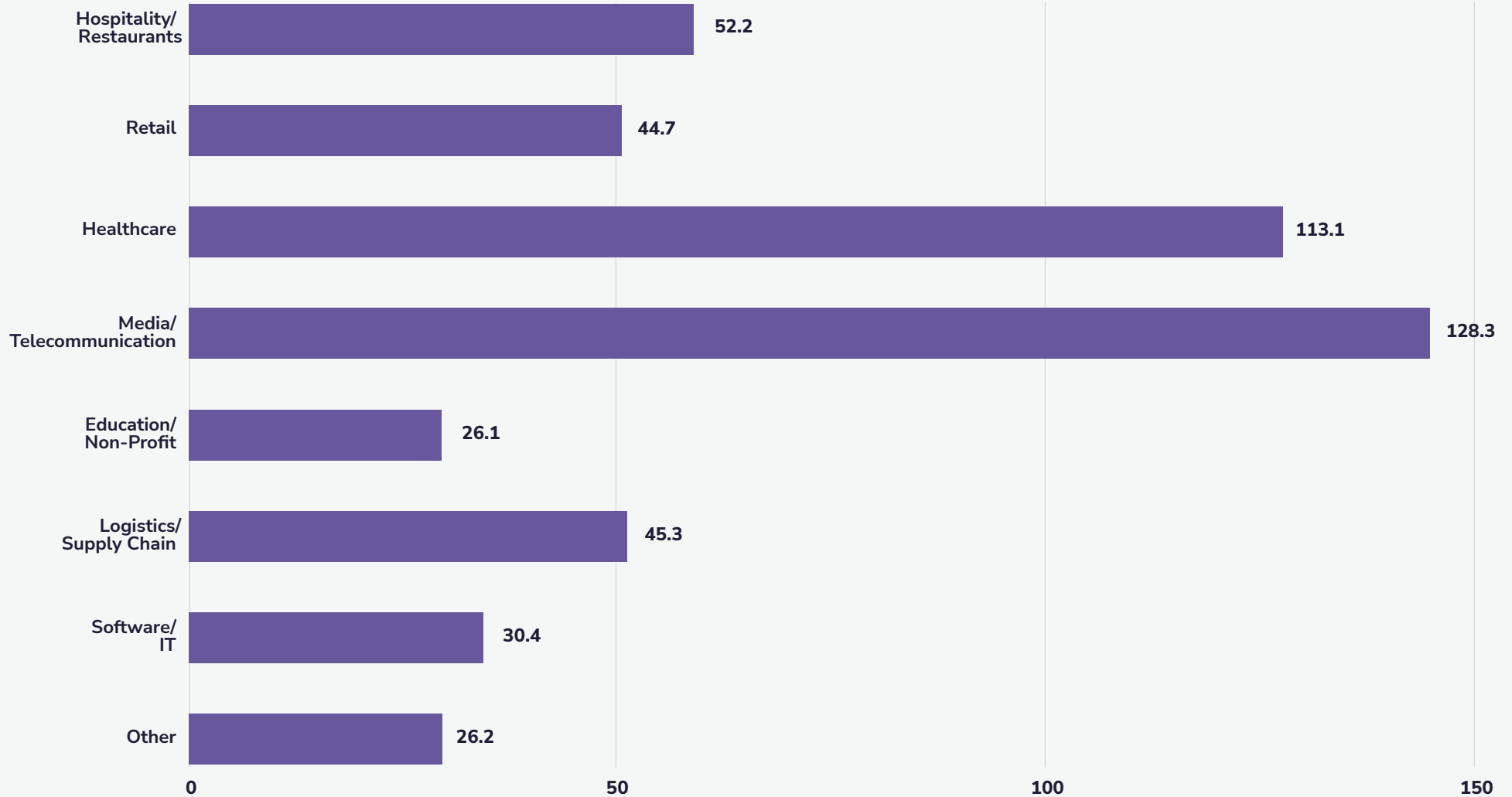But that's just one way to look at it. When combined with the number of device management users, we can approximate the average number of devices the typical device management employee (e.g. IT admin, device management engineer) is responsible for. On average, they're responsible for 49 devices each. The number of devices is highest in Media / Telecommunications (128) and Healthcare (113), and lowest in Education (26.1), Other (26.2), and Software/IT (30.4).

Average # of Users

Industry	Average # of Users
Hospitality/Restaurants	30.6
Retail	9.8
Healthcare	7
Media/Telecommunications	13
Education/Non-Profit	15.3
Logistics/Supply Chain	5
Software/IT	5.2
Other	3.8

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Average Devices Per User

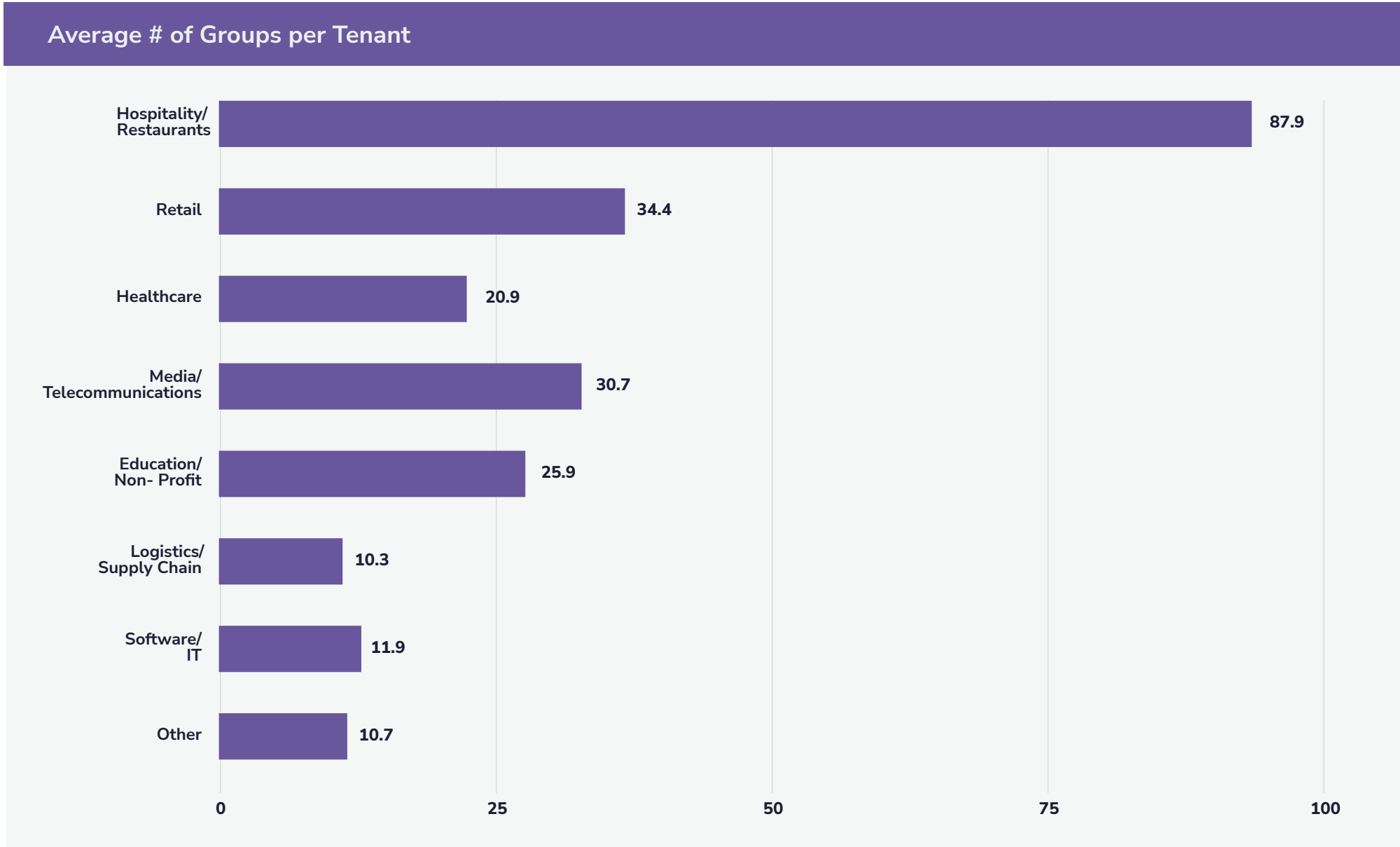| Industry	Average Devices Per User
Hospitality/Restaurants	52.2
Retail	44.7
Healthcare	113.1
Media/Telecommunication	128.3
Education/Non-Profit	26.1
Logistics/Supply Chain	45.3
Software/IT	30.4
Other	26.2

When it comes to organizing and managing device fleets, companies use a lot of device groups and subgroups. Device groups and hierarchies allow for more efficient management at scale, whether for targeted monitoring, creating homogeneous configurations, or sending commands to multiple devices at a time.

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On average, companies covered by the research use 25 device groups (down from 36.5 in 2023). Similar to 2023, we see that this average is skewed by the largest, most mature device fleets — the median company uses just 5 groups (6 in 2023). Once again, we see that companies in the Hospitality / Restaurant industry tend to use the most number of groups. We've seen this be aligned not only with having many locations but also with the diversity in device use cases (e.g. point of sale, kitchen display systems, dynamic menu signage, self-service kiosks).

Average # of Groups per Tenant

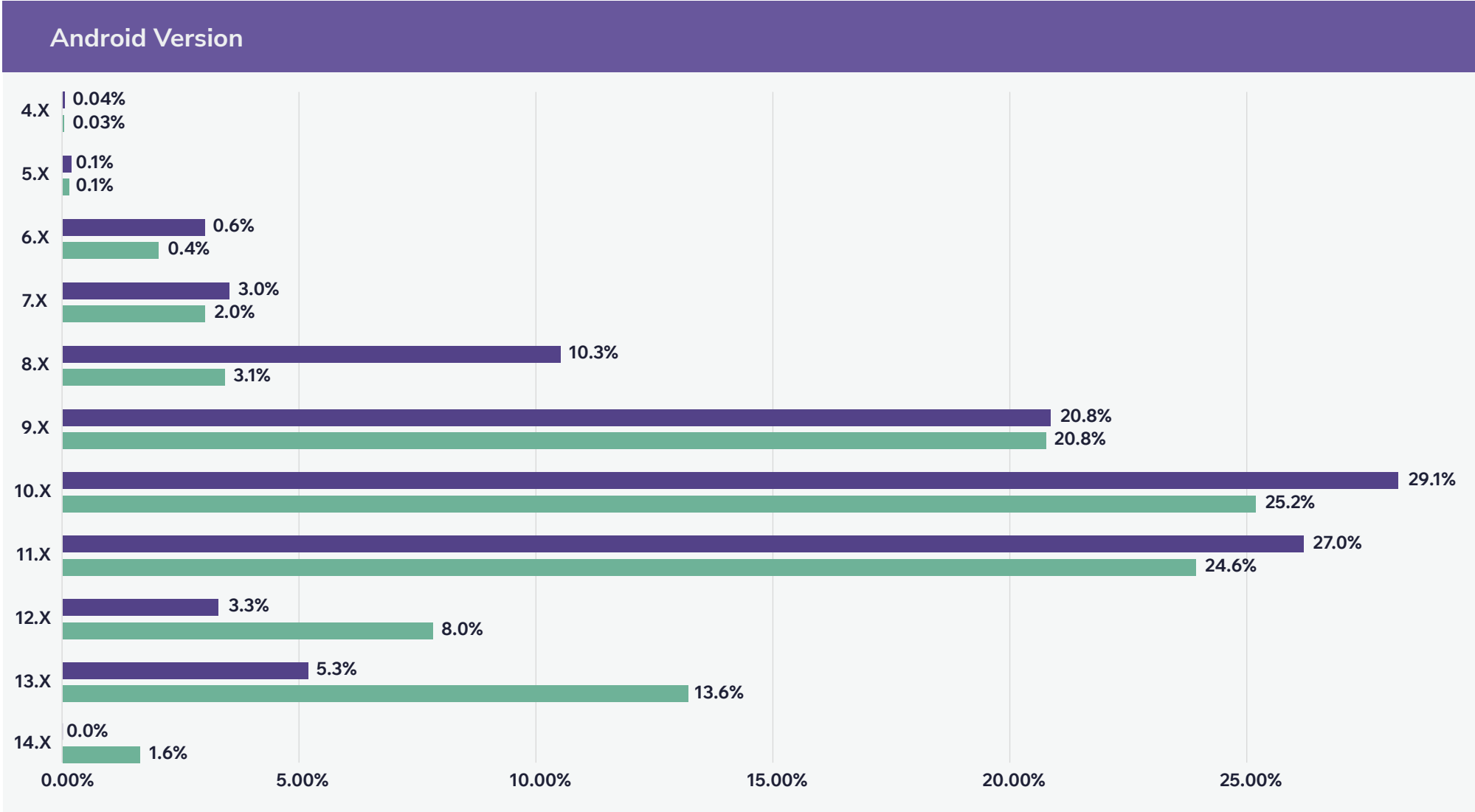| Industry	Value
Hospitality/Restaurants	87.9
Retail	34.4
Healthcare	20.9
Media/Telecommunications	30.7
Education/Non-Profit	25.9
Logistics/Supply Chain	10.3
Software/IT	11.9
Other	10.7

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Hardware and Operating Systems

Overall, we see large device fleets composed of off-the-shelf devices from OEMs like Lenovo, Samsung, Zebra, PARtech — but we also see a number of custom devices. Many of these are built on Qualcomm and Rockchip. In fact, when drilling in on Android Open Source Project (AOSP) devices, the plurality of devices are custom AOSP devices built on Qualcomm chips (20.4%).

Of the Android devices covered, 75% are GMS, a small uptick from 74% in 2023; conversely, 25% are AOSP (down 1% year over year).

GMS vs. AOSP Devices

GMS: 74% (2023), 75% (2024)
AOSP: 26% (2023), 25% (2024)
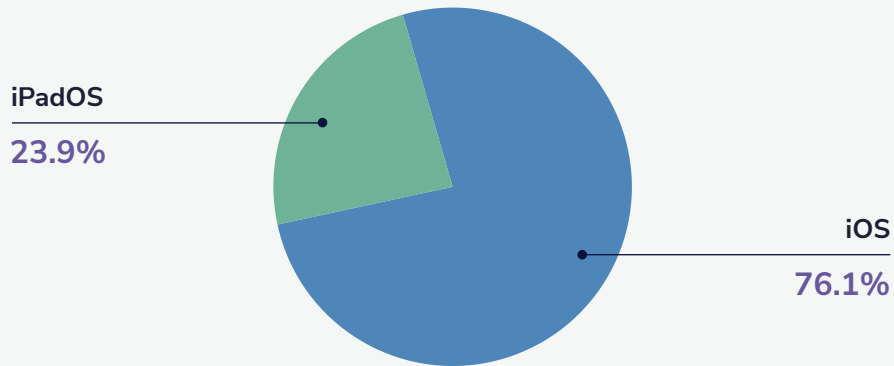
Legend: 2023, 2024

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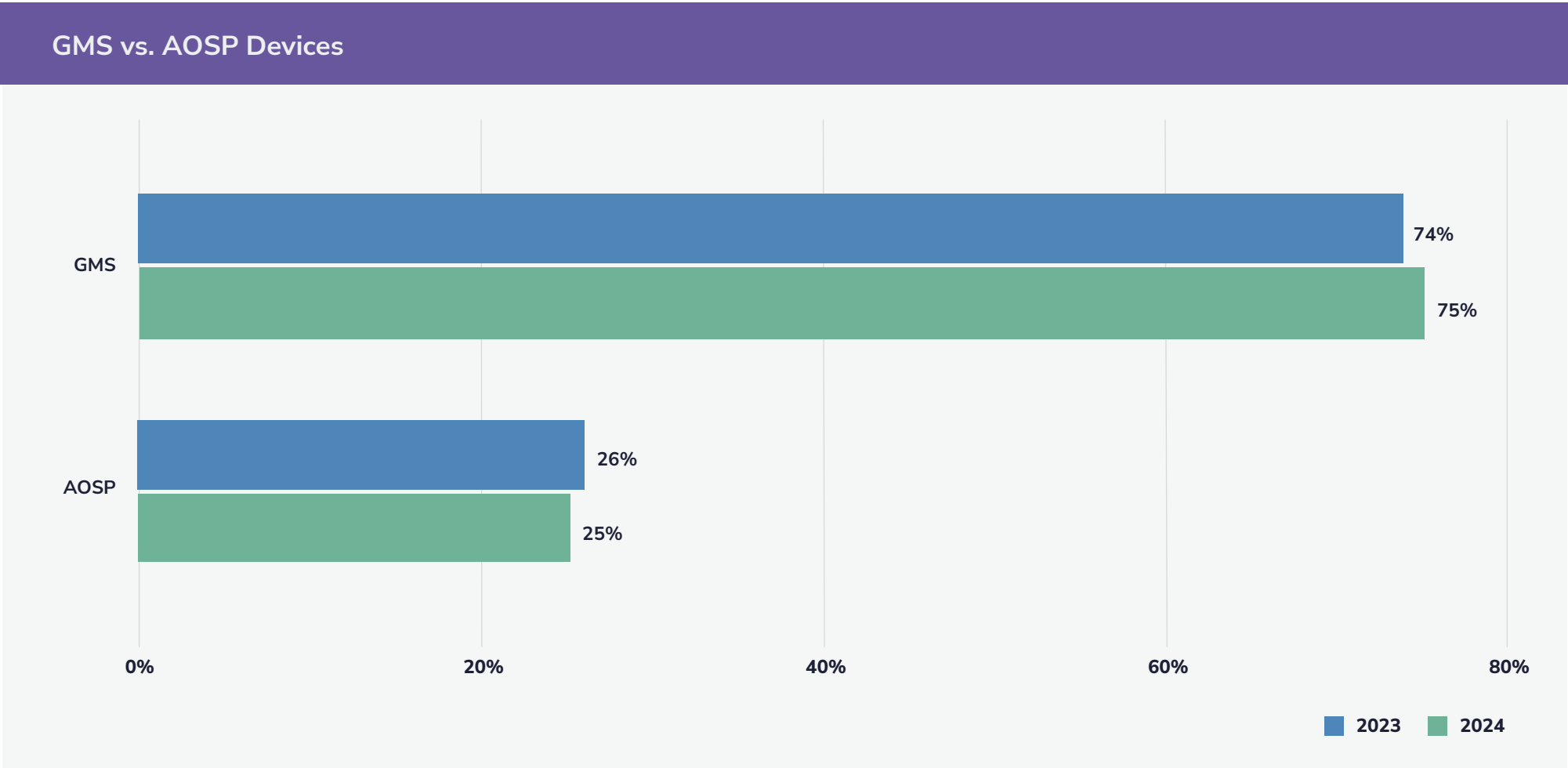
We are starting to see adoption of Android 12 (released to the public October 2021), Android 13 (August 2022), and Android 14 (October 2023), with companies rolling off of Android 7 and 8. Still, only about 1 out of every 4 devices are on the three latest versions. Similar to last year, the majority of devices remain on Android 9, 10, and 11 (71% in 2024 vs. 77% in 2023).

When it comes to hanging on to old versions, about 6% of devices are running meaningfully old Android versions (4.x-8.x). While circumstances can make updating a heavy lift, continuing to run on a significantly outdated OS version leaves devices open to security vulnerabilities.

Android Version

Version	Purple	Green
4.X	0.04%	0.03%
5.X	0.1%	0.1%
6.X	0.6%	0.4%
7.X	3.0%	2.0%
8.X	10.3%	3.1%
9.X	20.8%	20.8%
10.X	29.1%	25.2%
11.X	27.0%	24.6%
12.X	3.3%	8.0%
13.X	5.3%	13.6%
14.X	0.0%	1.6%

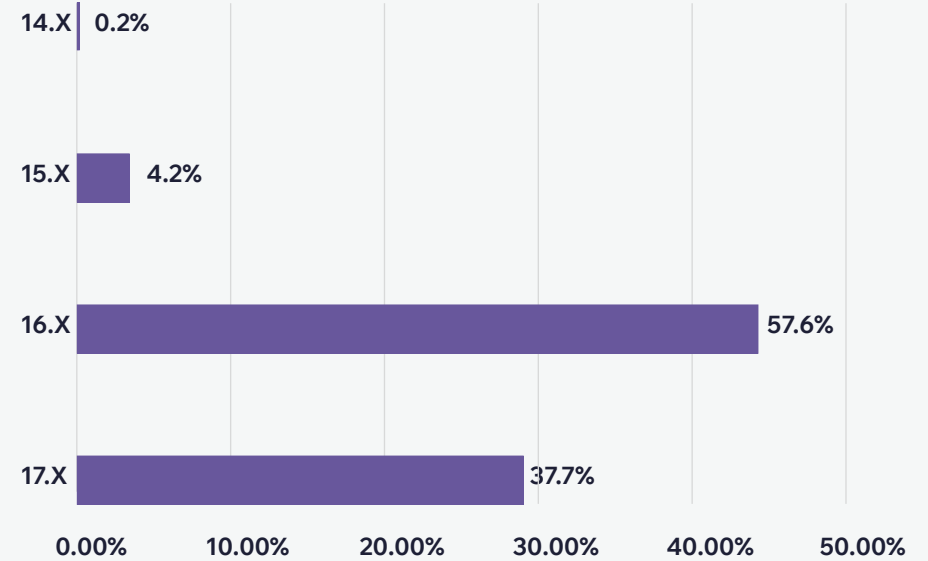For the first time, this report also covers iOS and iPadOS devices. These Apple devices tend to get updated more frequently. About 95% of iOS devices are on the latest two OS versions, compared to 15% for Android.
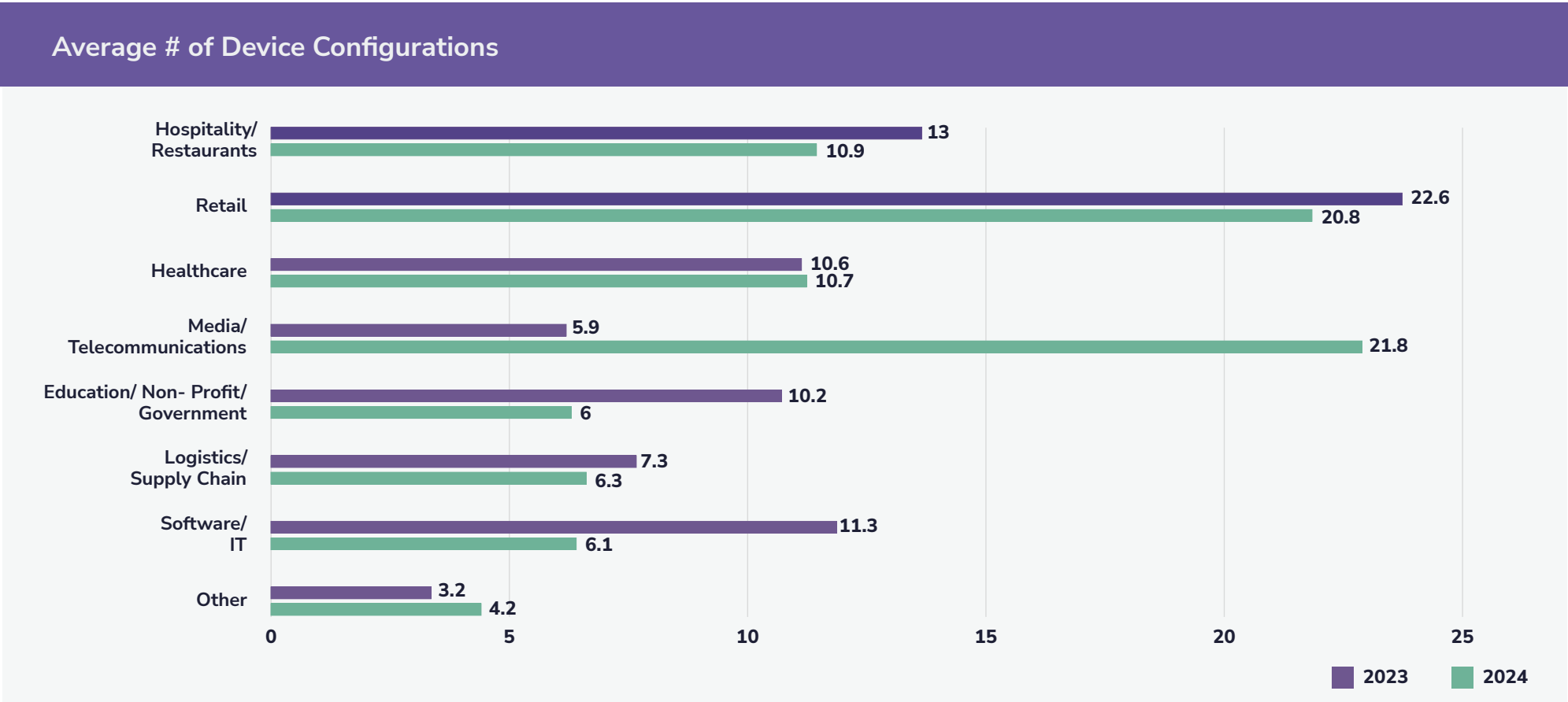
iOS vs. iPadOS

iPadOS
23.9%

iOS
76.1%

iOS/iPadOS Version

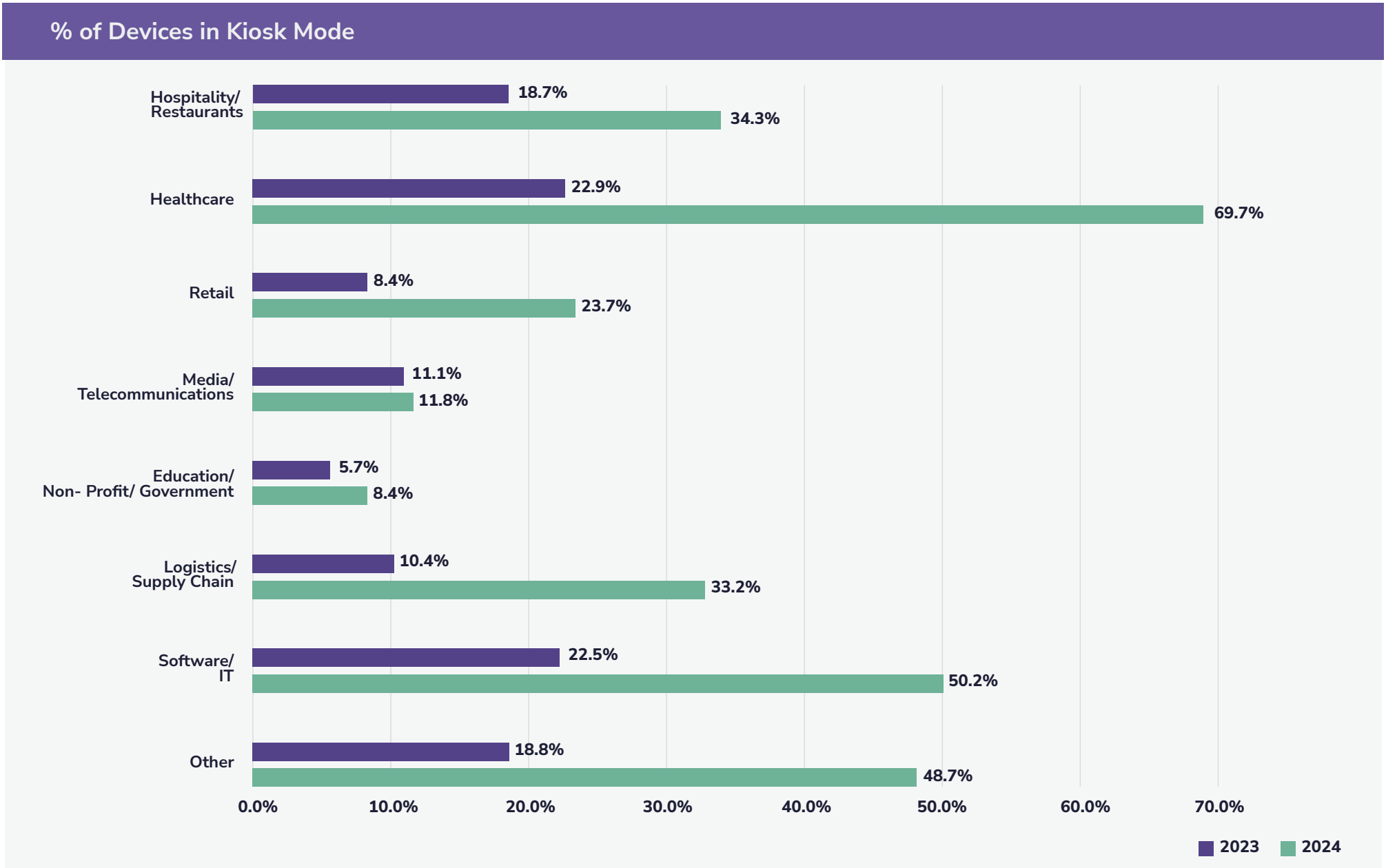| Version	Percentage
14.X	0.2%
15.X	4.2%
16.X	57.6%
17.X	37.7%

Device Configurations

Looking at device configurations, we can get a glimpse into how companies configure, provision, and manage devices at scale. For example, many purpose-built or dedicated device use cases require strong security as they may be out in open, public spaces. Others, which may be assigned to an employee, require the ability to easily and safely switch between multiple pre-installed applications.

Across industries, there has been a slight decline in the number of device configurations. The one notable exception is Media / Telecommunications companies, which saw a jump from 5.9 to 21.8 device configurations per tenant. This could possibly be due to an increase in media device use cases like signage, or an overall digital maturation of the industry.

Average # of Device Configurations

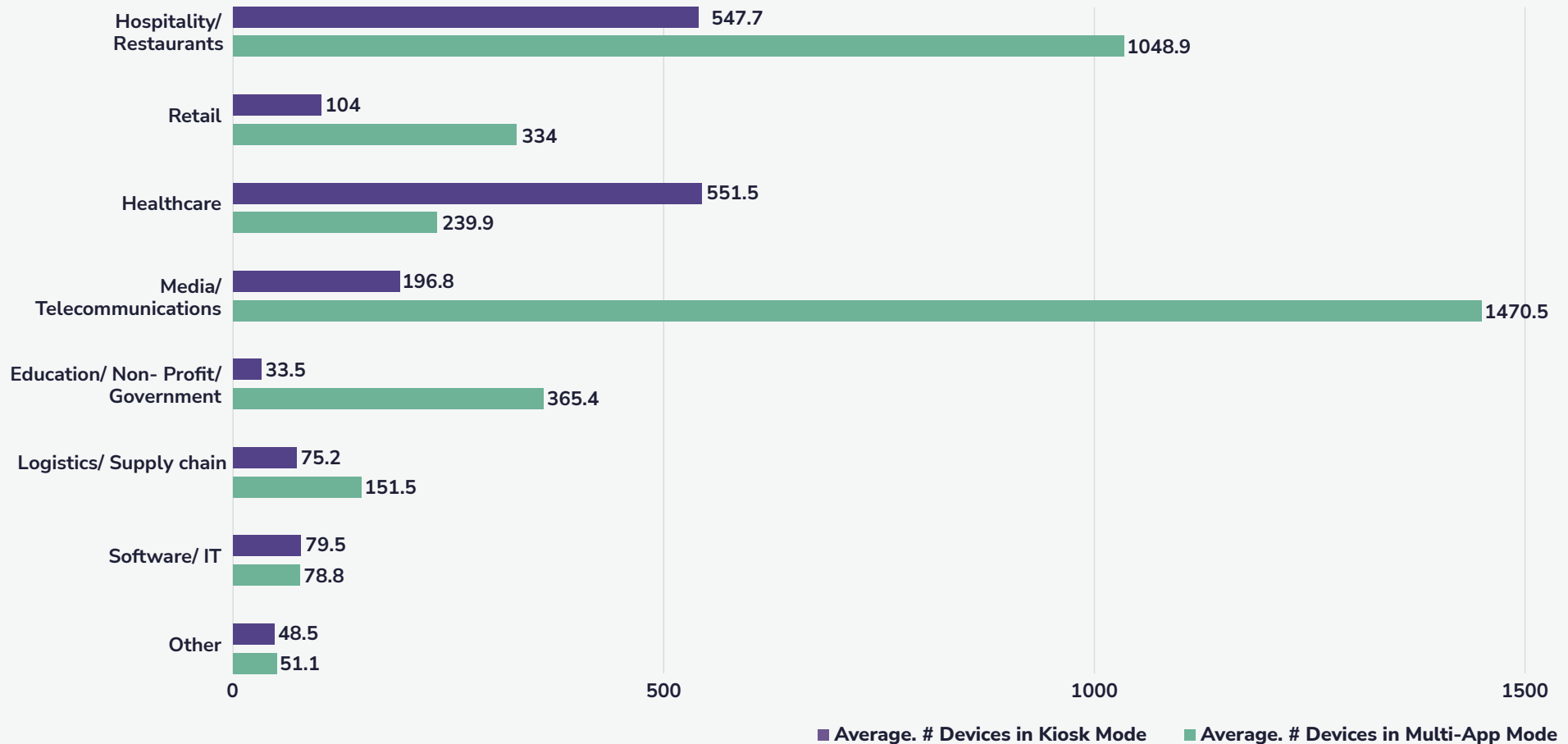| Industry	2023	2024
Hospitality/ Restaurants	13	10.9
Retail	22.6	20.8
Healthcare	10.6	10.7
Media/ Telecommunications	5.9	21.8
Education/ Non- Profit/ Government	10.2	6
Logistics/ Supply Chain	7.3	6.3
Software/ IT	11.3	6.1
Other	3.2	4.2

■ 2023   ■ 2024

Overall, many more devices are being locked down to a single app with kiosk mode. On average, 37.8% devices are being configured to kiosk mode compared to 16% in 2023. Kiosk mode is used more often in every industry analyzed—the largest increase is in the Healthcare sector, where 7 out of every 10 devices are now locked to a single application.

% of Devices in Kiosk Mode

Industry	2023	2024
Hospitality/ Restaurants	18.7%	34.3%
Healthcare	22.9%	69.7%
Retail	8.4%	23.7%
Media/ Telecommunications	11.1%	11.8%
Education/ Non-Profit/ Government	5.7%	8.4%
Logistics/ Supply Chain	10.4%	33.2%
Software/ IT	22.5%	50.2%
Other	18.8%	48.7%

■ 2023 ■ 2024

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While there was a stark increase in kiosk mode, the majority of devices across the board are still running multiple applications, also known as "fully managed" devices. *Note:* these multi-app use cases usually allow users to switch between pre-installed, pre-approved apps, rather than allowing users to download and use whatever applications they want.

As a percentage of the device fleet, devices in Education / Nonprofit / Government sectors most commonly make multiple applications available. An example would be to allow students to switch between an e-book reading app and a video player app. In correctional facilities, devices serve multiple purposes, such as video calls, email, commissary systems, and educational materials.
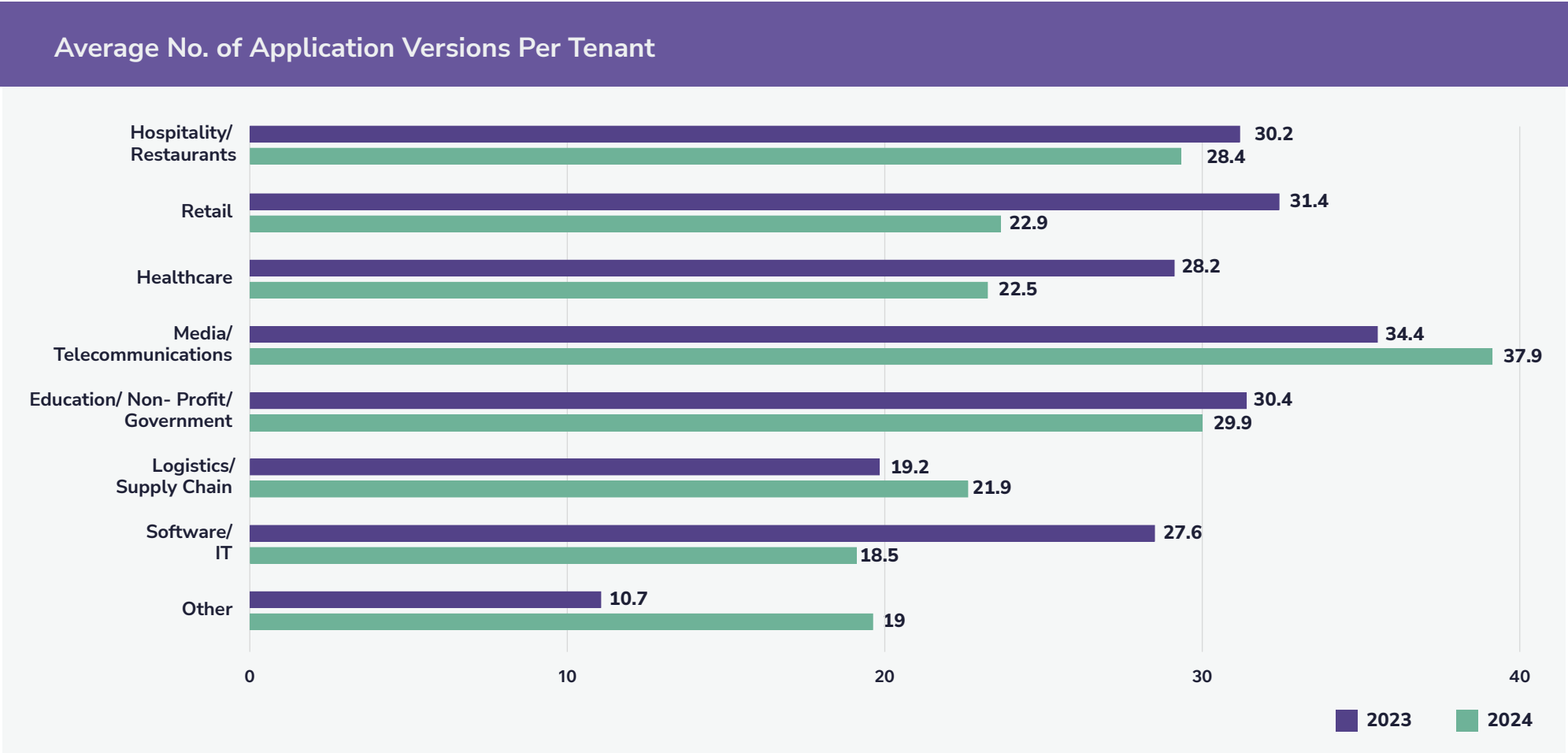
Average # of Devices in Kiosk Mode vs. Average # of Devices in Multi-App Mode

Sector	Average # Devices in Kiosk Mode	Average # Devices in Multi-App Mode
Hospitality/ Restaurants	547.7	1048.9
Retail	104	334
Healthcare	551.5	239.9
Media/ Telecommunications	196.8	1470.5
Education/ Non-Profit/ Government	33.5	365.4
Logistics/ Supply chain	75.2	151.5
Software/ IT	79.5	78.8
Other	48.5	51.1

■ Average. # Devices in Kiosk Mode ■ Average. # Devices in Multi-App Mode
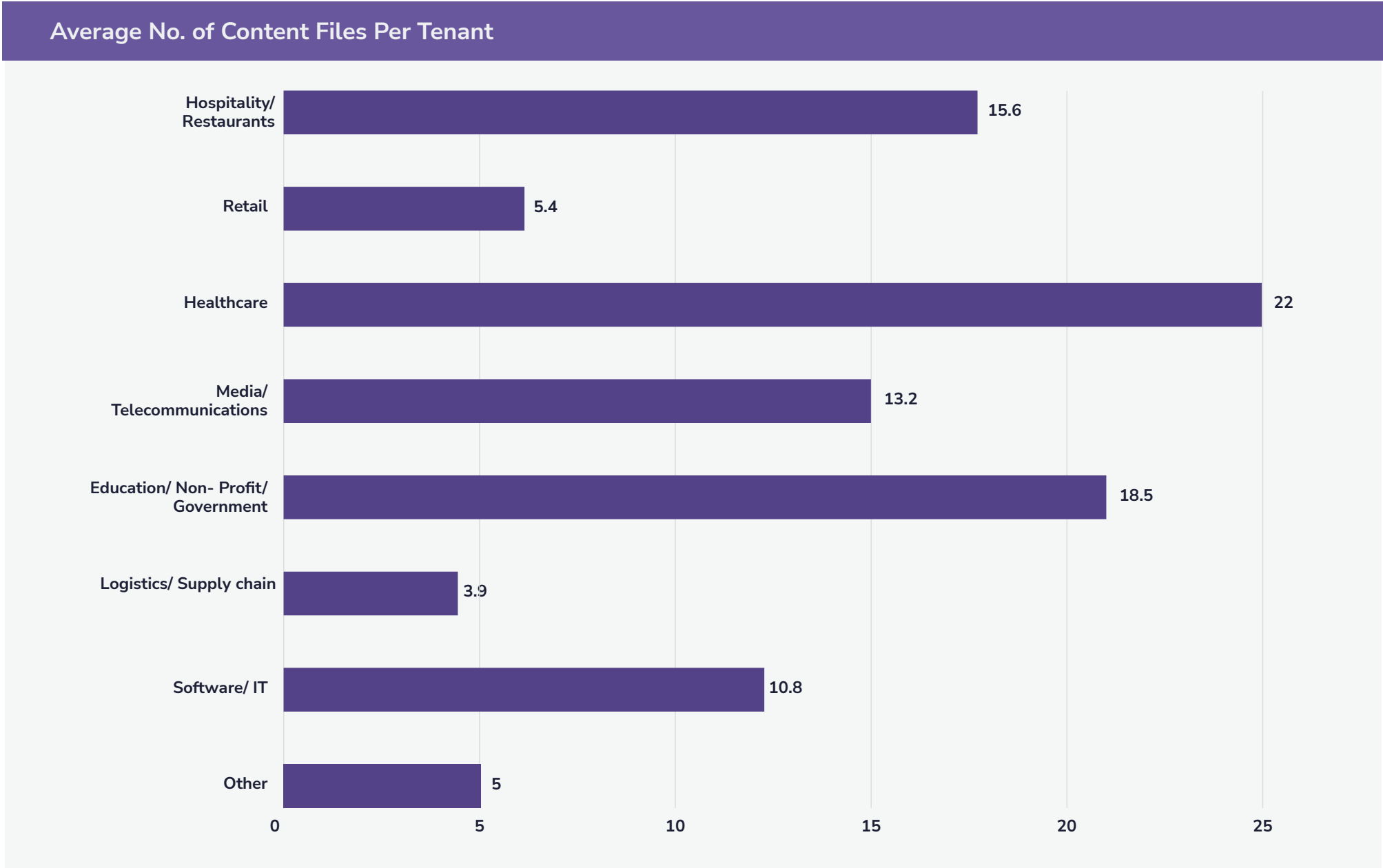
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Application and Content Delivery

In the inaugural State of Device Management report, we saw the importance of software in delivering innovative solutions through devices.

Year-over-year, the average number of applications (unique or new versions) per tenant held relatively steady at 22.5, compared to 23.5 in 2023. The largest increases were in Other (+8.3), Media / Telecommunications (+3.5), and Logistics / Supply Chain (+2.7), and the largest decreases were in Software / IT (-9.1), Retail (-8.5), and Healthcare (-5.7).

Average No. of Application Versions Per Tenant

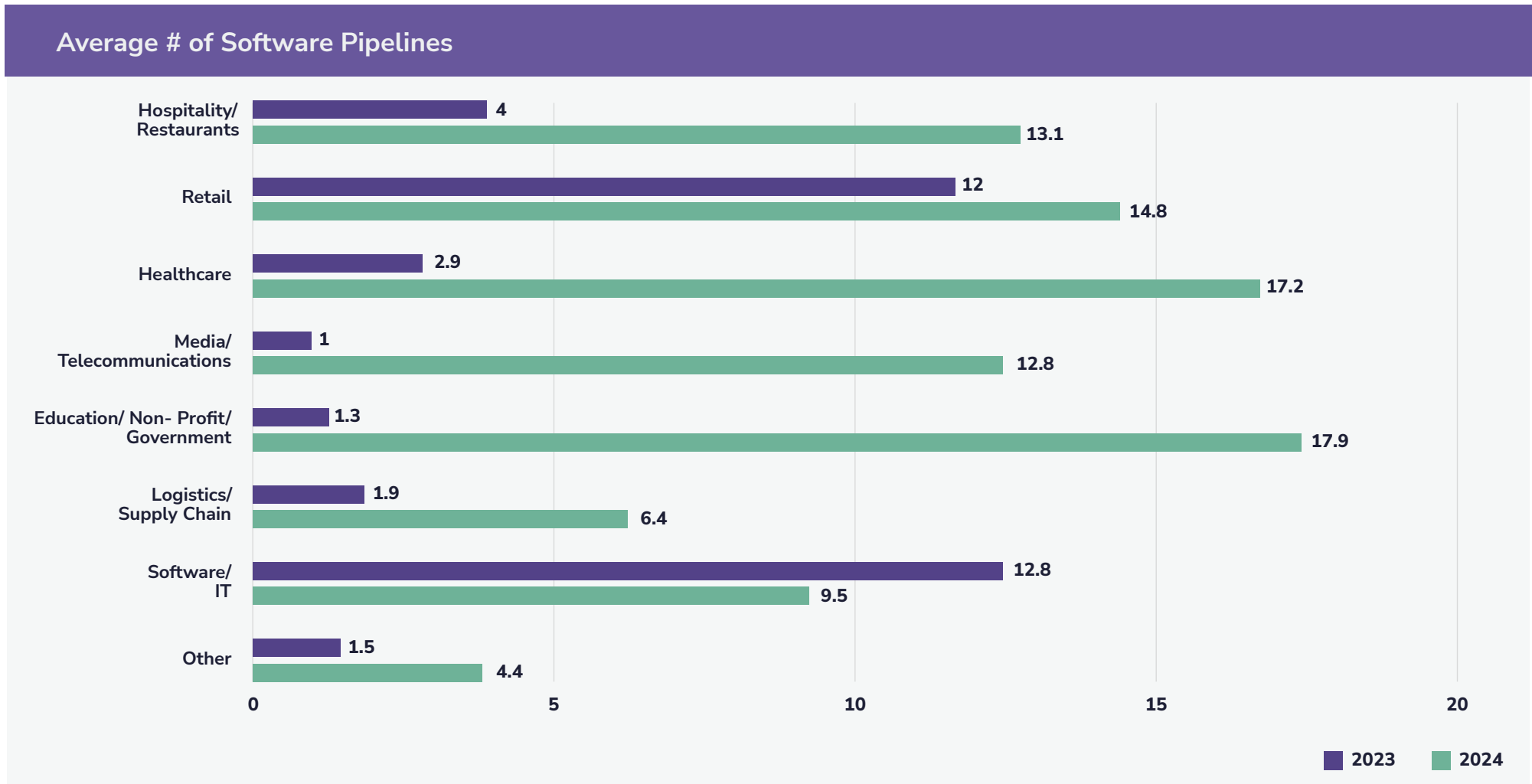| Industry	2023	2024
Hospitality/ Restaurants	30.2	28.4
Retail	31.4	22.9
Healthcare	28.2	22.5
Media/ Telecommunications	34.4	37.9
Education/ Non- Profit/ Government	30.4	29.9
Logistics/ Supply Chain	19.2	21.9
Software/ IT	27.6	18.5
Other	10.7	19

2023   2024

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Today's experiences are not just delivered through applications. To deliver simpler experiences, companies are also using content files, such as documents or videos, on their devices. On average, companies host 11 content files per tenant. Healthcare (22.0), Hospitality / Restaurants (15.6), and Media / Telecommunications (13.2) have the most content files, while Logistics / Supply Chain (3.9), Other (5), and Retail (5.4) have the least.

Average No. of Content Files Per Tenant

Category	Value
Hospitality/ Restaurants	15.6
Retail	5.4
Healthcare	22
Media/ Telecommunications	13.2
Education/ Non- Profit/ Government	18.5
Logistics/ Supply chain	3.9
Software/ IT	10.8
Other	5

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Perhaps the clearest signal of the leap in modern device management maturity is the integration of software pipelines in the device software lifecycle. Pipelines, a concept from CI/CD in cloud software deployment, allow for more continuous software releases to endpoints (i.e. devices). They work by creating an automated release workflow, often starting in small batches, that allow for testing and validation at a smaller scale before scaling out to all targets.

Of the companies that leverage pipelines, the number of pipelines used more than doubled, from 4.4 in 2023 to 10.4 in 2024. This modern software rollout mechanism was most prevalent in Education (17.9 pipelines), Healthcare (17.2), and Retail (14.8), and least prevalent in Other (4.4), Logistics / Supply Chain (6.4), Software / IT (9.5).

Average # of Software Pipelines

Category	2023	2024
Hospitality/ Restaurants	4	13.1
Retail	12	14.8
Healthcare	2.9	17.2
Media/ Telecommunications	1	12.8
Education/ Non- Profit/ Government	1.3	17.9
Logistics/ Supply Chain	1.9	6.4
Software/ IT	12.8	9.5
Other	1.5	4.4

■ 2023 ■ 2024

The most mature organizations, when it comes to device management, are way ahead of the rest of the market. This gives us a glimpse into the future as the adoption curve shifts and the majority catch up to the more mature early adopters.
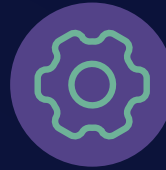
Device configurations

Average Tenant	Top 50
7.8	64.8

Device groups

Average Tenant	Top 50
25.0	354.0

Applications

Average Tenant	Top 50
22.5	118.5

Pipelines

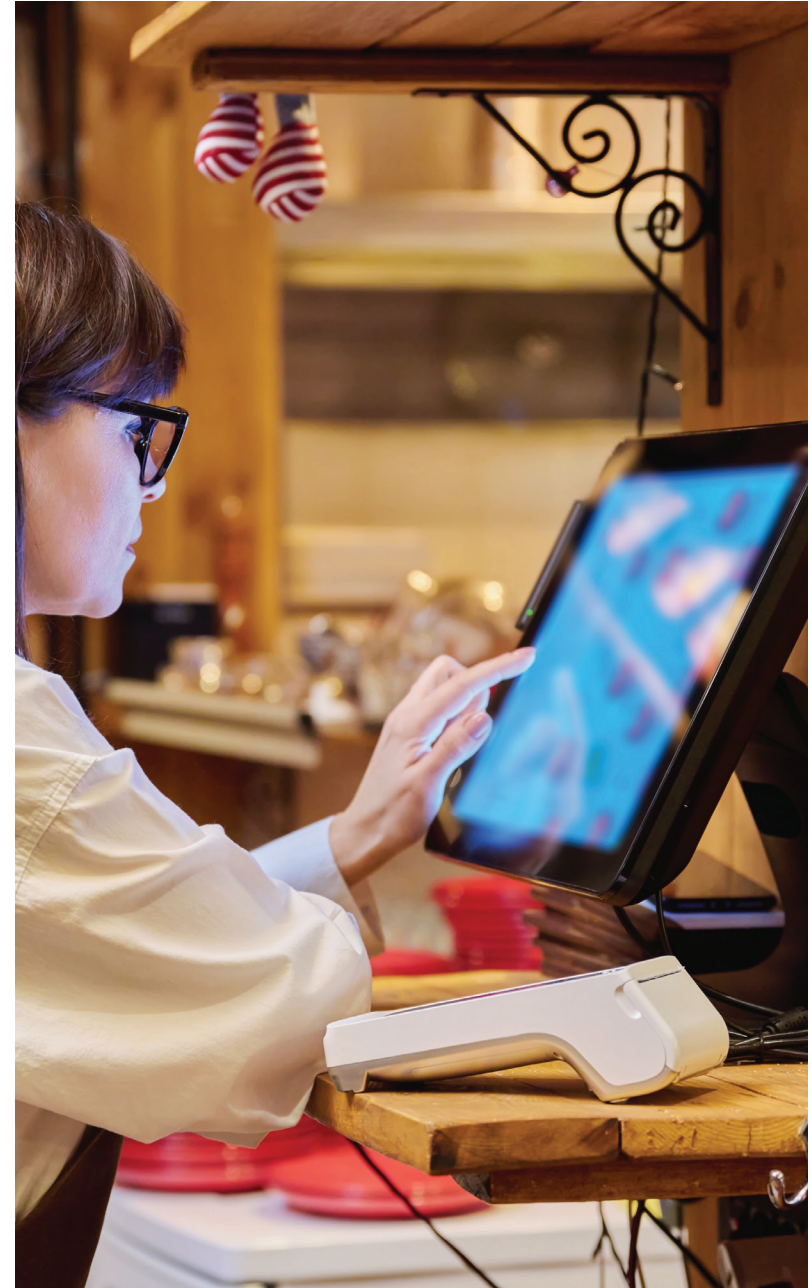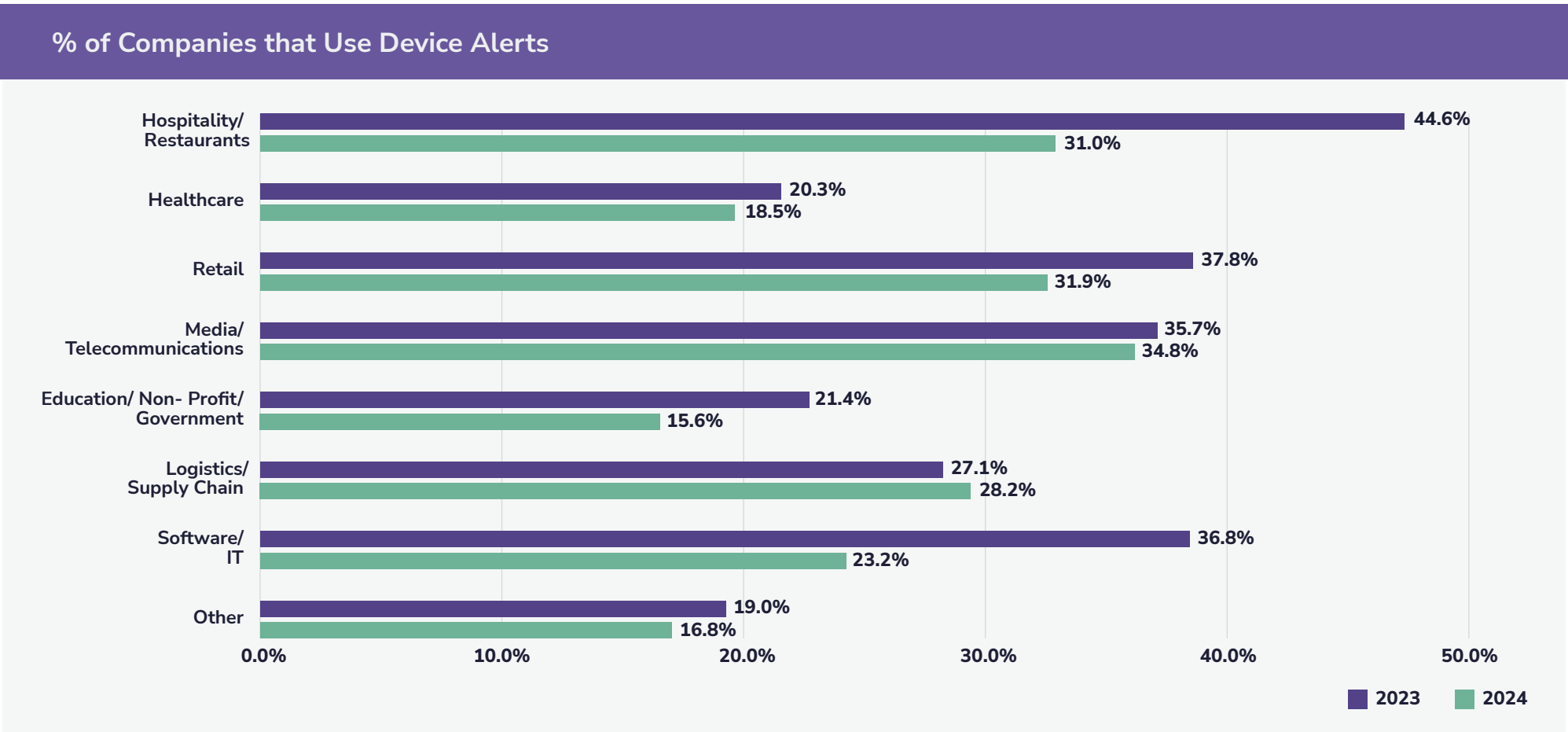| Average Tenant	Top 50
10.4	72.7

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Fleet Monitoring with Alerts

Overall, 22.4% of companies included in the report are using device alerts, such as a device going offline, low battery, or lost Bluetooth connectivity. This is a decline from 29% in 2023.

Media / Telecommunications (34.8%), Retail (31.9%), and Hospitality / Restaurants (31.0%) are the top industries to use alerts, while Education / Nonprofit / Government (15.6%), Other (16.8%), and Healthcare (18.5%) are at the bottom. The largest declines are in Hospitality / Restaurants (-13.6%), Software / IT (-13.2%), and Education / Nonprofit / Government (-5.8%). Only Logistics / Supply Chain saw an increase (1.1%).

% of Companies that Use Device Alerts

Industry	2023	2024
Hospitality/ Restaurants	44.6%	31.0%
Healthcare	20.3%	18.5%
Retail	37.8%	31.9%
Media/ Telecommunications	35.7%	34.8%
Education/ Non- Profit/ Government	21.4%	15.6%
Logistics/ Supply Chain	27.1%	28.2%
Software/ IT	36.8%	23.2%
Other	19.0%	16.8%

2023   2024

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Average # of Alerts per Tenant

Category	Value
Hospitality/ Restaurants	3.1
Retail	2.9
Healthcare	2.1
Media/ Telecommunications	1.9
Education/ Non- Profit/ Government	1.6
Software/ IT	1.9
Other	2.4

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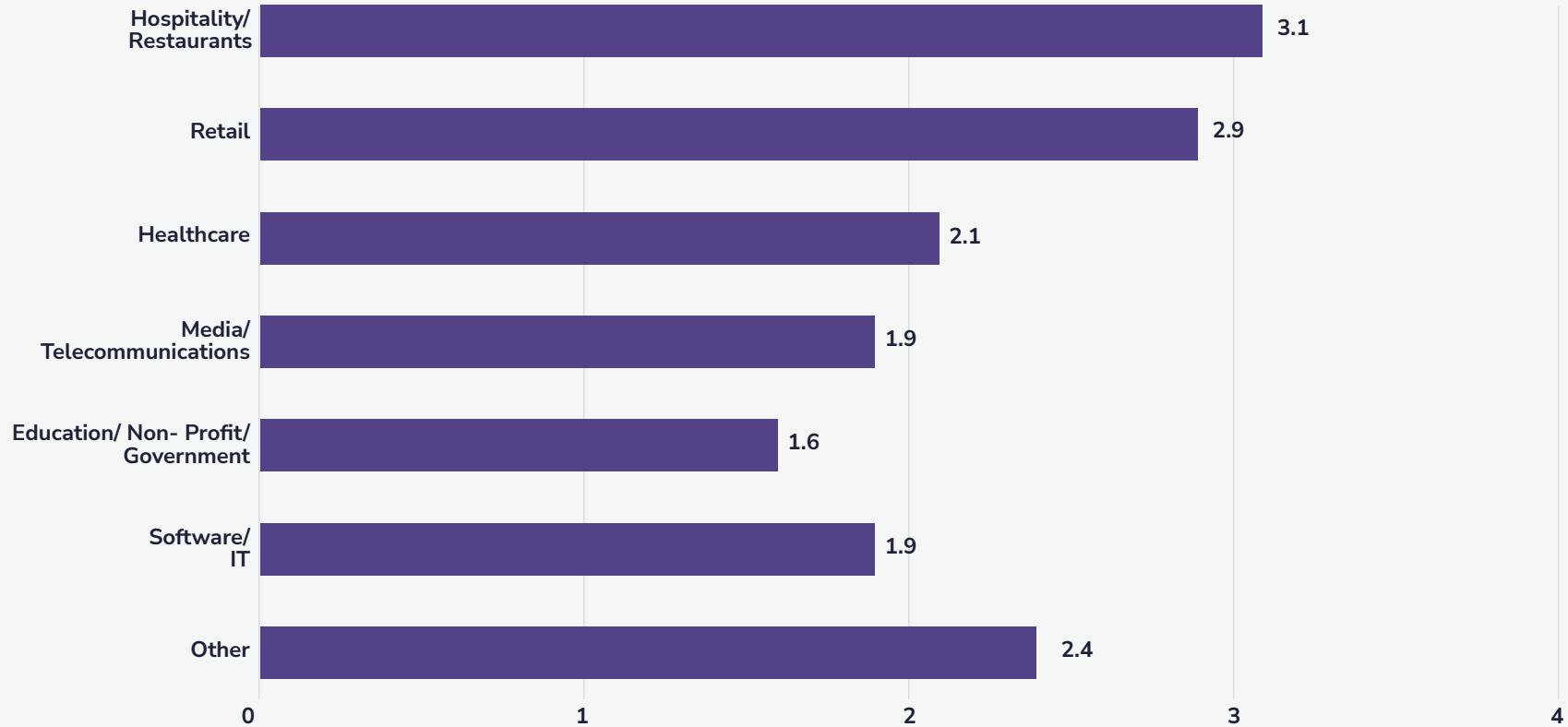
Industry Deep Dive

As mentioned in the introduction, industry definitions — when it comes to device use cases — are admittedly blurry. Device solutions have another wrinkle: there's tremendous diversity when it comes to who owns and manages devices for an organization. Many organizations have sophisticated technology teams who prefer to have control of all their technology (including the device solutions). Others look to outside vendors to partner with to deliver and/or maintain the hardware, software, or both. We see this complex dynamic illustrated best in the Hospitality / Restaurant and Healthcare industries. In this chapter, we'll take a deeper look at these two industries and attempt to disentangle device solutions built and managed by the organization themselves and device solutions built (and sometimes managed) by third parties, who we will call Solution Providers.

Hospitality / Restaurants

Like most industries, the Hospitality industry is in the midst of digital evolution, looking to technology to increase efficiency through automation. This includes everything from mobile ordering and self-checkout kiosks to better order management and robots supplementing staff amidst labor shortages. With everything seemingly in flux, it's no wonder that many are looking to Solution Providers to help them navigate the deep technology waters.

On average, Solution Providers that sell to the Hospitality / Restaurant industry have significantly larger fleets and significantly larger teams responsible for managing those devices. This suggests something about scale: at a limited scale, it's possible for operators to own and manage their own devices. But for many who require many devices, say in the thousands, it makes sense to work with partners to handle those devices and device management, where that is their primary focus.

Solution Providers also have more complex device management needs. They average more applications, device configurations, groups, software pipelines, and device alerts.

	Operators	Solution Providers	Total
Average # Users	9.9	65.9	30.6
Avg. # Devices Per Tenant	729.8	3035.9	1596.6
Avg. Devices Per User	73.7	46.1	52.2
Avg. # Devices in Kiosk Mode	329.4	910.2	547.7
Avg. # Devices in Multi-App Mode	400.4	2125.7	1048.9
Kiosk Mode %	45.1%	30.0%	34.3%
Multi-App Mode %	54.9%	70.0%	65.7%
Avg. # Apps Per Tenant	21.8	39.7	28.4
Avg. # Content Files Per Tenant	19.8	10.7	15.6
Avg. # Device Configurations Per Tenant	5.5	19.6	10.9
Avg. # Groups Per Tenant	87.1	89.4	87.9
Avg. # Pipelines Per Tenant	6.6	20	13.1
Avg. # Alerts Per Tenant	2.3	4	3.1

Healthcare

Ripe with opportunity for innovation on the back of a global pandemic that forced open the door for remote care and decentralization, devices are proliferating across numerous Healthcare segments. This has opened the door for Healthcare Solution Providers to specialize in innovative product solutions that meet the varied care needs of today's population.

Similar to the patterns observed in the Hospitality industry, Solution Providers offer scaled solutions when deploying and managing devices becomes tricky. The average Solution Provider's device fleet is more than five times as large. They also manage more applications, content files, device configurations, groups, and alerts than Healthcare Operators.

	Operators	Solution Providers	Total
Average # Users	3.8	10.3	7
Avg. # Devices Per Tenant	270.2	1332.3	791.4
Avg. Devices Per User	71.1	129.3	113.1
Avg. # Devices in Kiosk Mode	189.5	927.1	551.5
Avg. # Devices in Multi-App Mode	80.7	405.2	239.9
Kiosk Mode %	71.2%	69.6%	69.7%
Multi-App Mode %	29.8%	30.4%	30.3%
Avg. # Apps Per Tenant	19.9	25.2	22.5
Avg. # Content Files Per Tenant	1.9	47.5	22
Avg. # Device Configurations Per Tenant	5.9	16.4	10.7
Avg. # Groups Per Tenant	9.0	33.5	20.9
Avg. # Pipelines Per Tenant	22.0	13.4	17.2
Avg. # Alerts Per Tenant	1.3	2.6	2.1

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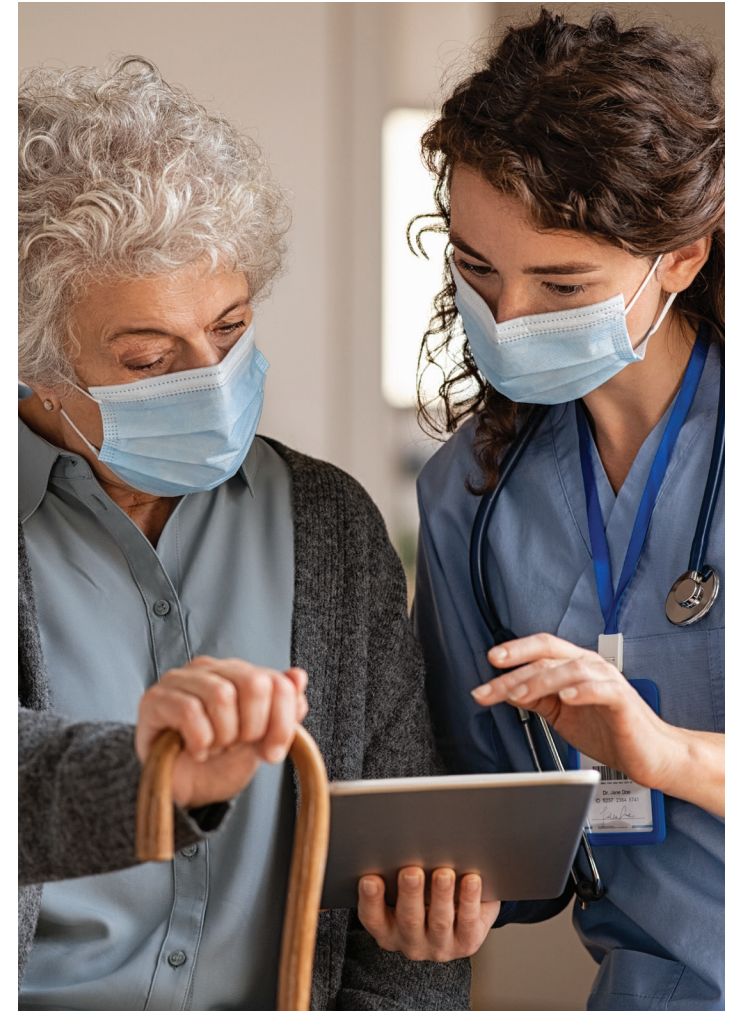
Conclusion

While modern device management may feel, in certain aspects, like pushing the bounds of digital transformation, it's clear that we're still in the early stages. With the dominating hype of AI, it's just a matter of time until AI device use cases become the key differentiator between industry leaders and laggards. Based on the research presented in this report, the gap between those who are building the workflows and habits to seamlessly integrate AI into their device use cases (i.e. "Edge AI") — through things like getting comfortable with app updates, using software pipelines for fast and confident releases, and strong monitoring tools and telemetry data — are going to have a real head start.

It's hard to predict when edge AI — or even the next big thing — will hit the mainstream. The best thing you can do is to prepare and build the habits to move fast. Are you ready?

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Methodology

This report uses anonymized and aggregated first-party data and references third-party research through April 2024.

Industries included in this research:

- **Hospitality:** device solutions used by restaurants, hotels, entertainment venues

- **Healthcare:** device solutions used by healthcare networks, healthcare facilities, pharmaceuticals, and other organizations that provide remote care or clinical trials

- **Retail:** device solutions used by retailers including department stores, convenience stores, grocery stores, etc.

- **Logistics / Transportation:** device solutions used in transportation, supply chain, or fulfillment

- **Education / Nonprofit / Government:** device solutions used by educational organizations, NGOs, or governmental entities

- **Software / IT Services:** device solutions operated by software or other IT service providers

- **Media / Telecommunications:** device solutions operated by media, digital signage, or telecommunications providers

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