

## Lenovo ThinkPad X1 Yoga Gen 8: A flexible alternative to the clamshell

We compared a 14-inch Apple MacBook Pro (2023) to the Lenovo ThinkPad X1 Yoga Gen 8, a convertible laptop/tablet that bends over backwards to give you what you want

Whether you're already a Microsoft Windows fan or you're used to working in Apple® macOS®, it might be time to consider upgrading to the 14-inch Lenovo® ThinkPad® X1 Yoga Gen 8. When we ordered devices for this evaluation, this Lenovo touch-capable Windows 11 Pro business laptop was \$1,360 less expensive and half a pound lighter than its 14-inch Apple MacBook Pro (2023) counterpart—plus it moonlights as a tablet!

Even better, we found that the Lenovo ThinkPad X1 Yoga Gen 8 received higher benchmark scores, completed Microsoft 365 tasks in less time, and used fewer CPU resources during Zoom meetings than the Apple MacBook Pro (2023).

At the time of testing, the 14-inch MacBook Pro offered only open or closed clamshell (no tablet or touch-capable screen options) and Automatic (balanced) or Low Power Mode (best battery life) power settings.<sup>1</sup> The Lenovo ThinkPad X1 Yoga Gen 8, on the other hand, provided a versatile touchscreen, and we could prioritize speed by setting it to best performance power mode. While choosing the canvas you're working and playing on is ultimately a personal decision, we're here to help with system responsiveness and user experience evaluations of both systems.



**Be able to  
do more**

Higher CrossMark™ and WebXPRT benchmark overall scores



**Be more  
efficient**

Faster Microsoft 365 task completion



**Be better  
connected**

Solid mic noise reduction and louder speaker volume with less CPU usage during Zoom meetings

## About the Lenovo ThinkPad X1 Yoga Gen 8

This versatile business laptop is an Intel® Evo™ and Intel vPro® platform powered by a 13<sup>th</sup> Generation Intel® Core™ processor and Intel Iris® X<sup>e</sup> graphics. It has, according to Lenovo, twice the memory and storage of the previous-generation model, advanced thermal capabilities with dual fans and rear ventilation, and an optional high-res OLED display with Eyesafe® certification.<sup>2</sup>



### Lenovo ThinkPad X1 Yoga Gen 8 vs 14-inch Apple MacBook Pro (2023)

#### Greater tactile interaction

Built-in touchscreen vs. none

13.4% lighter

3.08 lbs. vs. 3.56 lbs.

#### Built-in remote manageability<sup>3</sup>

Intel vPro™ with Intel Active Management Technology vs. none

#### Meets strict Intel processor-based laptop criteria<sup>4</sup>

Intel EVO™ certified vs. not

#### Modern wireless connectivity

Wi-Fi 6E and Bluetooth 5.3\*

#### Connects with Android or iOS phones

Intel Unison™<sup>5</sup> connects PCs with Android and/or iOS phones  
Apple Continuity<sup>6</sup> connects macOS devices with only iOS phones

#### More business-focused connections

2x Thunderbolt™ 4 ports  
2x USB-A 3.2 ports  
1x HDMI® port  
1x headphone/mic combo  
1x Kensington Nano Security slot

vs.

3x Thunderbolt 4 ports  
1x SDXC card slot  
1x HDMI port  
1x headphone jack  
No security slots  
No USB-A ports\*\*

\*Both systems had these features.

\*\*USB-A is a common connection type for wired and wireless connections to office essentials such as printers, scanners, mice, and external hard drives.<sup>7</sup> Instead, the 14-inch Apple MacBook Pro (2023) has an SDXC card slot that allows users to store information on an external drive or import images from a digital camera.<sup>8</sup>

## About the Intel Core i7-1370P processor

Intel designed the new 13<sup>th</sup> Generation Intel Core P-series mobile processors to power the latest enthusiast, thin-and-light laptop designs and Internet of Things (IoT) devices.<sup>9</sup> The Intel Core i7-1370P processor we tested has a 24MB cache, a max turbo frequency of 5.2 GHz, 14 cores (6 Performance-cores and 8 Efficient-cores), 20 threads, and enhanced Intel Thread Director controller.<sup>10</sup>

Laptop

Tent



### Go with the flow

The ThinkPad X1 Yoga Gen 8 pivots between laptop mode and tablet mode on a 360-degree hinge, with tent mode and stand mode stops along the way. This flexibility enables you to adapt your work surface to suit your mood and complete tasks more intuitively. You can answer email on the laptop mode keyboard, flip to stand mode while you sketch out an idea, attend a Zoom meeting in tent mode, and take notes during an in-person meeting in tablet mode.



Stand



Tablet

The 14-inch MacBook Pro only offered open or closed clamshell (no tablet or touch-capable screen options).

## Real-world ThinkPad X1 Yoga Gen 8 packaging

We took pictures during our unboxing process so you could see the sustainable packaging for yourself.



Figure 1: Lenovo ThinkPad X1 Yoga Gen 8 unboxing process, Home-compostable sugar cane fiber packaging and bamboo fiber gift box.

## ThinkPad X1 Yoga Gen 8 sustainability

A 2020 study shows that consumers not only prioritize sustainability—they're willing to pay more for products that have sustainable packaging.<sup>11</sup> One of the ways Lenovo is committed to reaching net-zero emissions by 2050 is by providing environmentally conscious products that arrive in minimal recycled or biodegradable packaging materials.<sup>12</sup> To this end, Lenovo says that the Lenovo ThinkPad X1 Yoga Gen 8 is ENERGY STAR® certified and designed with these sustainability specs:

- The bottom cover contains 55 percent recycled aluminum
- The speaker enclosure contains 90 percent post-consumer content (PCC) recycled plastic
- The 57 WHr battery enclosure contains 25-30 percent PCC recycled plastic
- The standard 45W and 65W adapters contains 90 percent PCC recycled plastic
- Components are attached with low-temperature solder
- The laptops ships in plastic-free packaging with 90 percent recycled and Forest Stewardship Council (FSC®) certified plastic-free content<sup>13</sup>



## How we tested

Before we started our hands-on evaluation, we set the Windows power mode on the Lenovo ThinkPad X1 Yoga Gen 8 to “Best performance.” Because the 14-inch MacBook Pro (2023) has no such performance-boosting setting, we left it as it came out of the box. Other than making and verifying that single change, we used out-of-box OEM performance settings for both laptops:

- **Lenovo ThinkPad X1 Yoga Gen 8** running Windows 11 Pro, powered by a 13<sup>th</sup> generation Intel Core i7-1370P processor (3.9 – 5.2 GHz), 14 cores, Intel Iris Xe graphics, 64 GB of memory, 1 TB of SSD storage. This convertible laptop/tablet also comes with an integrated pen. Cost on July 12, 2023: \$2,339.
- **14-inch Apple MacBook Pro** running macOS Ventura, powered by an M2 Max processor (3.68 GHz), 12 cores, M2 Max 38-core GPU, 64 GB of memory, 1 TB of SSD storage. Cost on July 12, 2023: \$3,699.

We ran four benchmarks to assess performance on the two devices:

- **Cinebench R23** evaluates CPU and GPU capabilities using Redshift, a Cinema 4D rendering engine, and reports system performance under a heavy load.<sup>14</sup>
- **CrossMark** evaluates how well devices handle diverse tasks such as application and file launches; web browsing; document, photo, and video editing; scientific simulation forecast modeling within a spreadsheet application; and multitasking.<sup>15</sup>
- **WebXPRT 4** is a browser benchmark that runs a series of tests including HTML and JavaScript handling as well as online homework, photo manipulation, and face-detection tasks.<sup>16</sup>
- We used **Speedtest by Ookla** to measure the upload and download speeds between each laptop and a test server, through the Google Chrome™ browser.

To round out our user-focused testing, we also hand-timed how long it took to complete common Microsoft 365 tasks, compared CPU usage during Zoom meetings, and conducted specialized speaker and microphone comparisons on both systems.

All of the results we report reflect the specific configurations we tested. Any difference in the configurations you test, as well as browsers, screen brightness, network traffic, or software additions, can affect these results. For more information on these 14-inch laptops as well as our testing parameters and procedures, see the [science behind the report](#).

## Primary function results

While physical features such as display quality, portability, and enough ports to handle all your accessories are important, a great laptop's primary function is to rapidly respond to requests and help you complete tasks as quickly as possible. However, every user uses their laptop for different tasks. That's why we conducted so many different system responsiveness and performance tests—each benchmark and hand-timed Microsoft 365 test stressed the systems differently. Before you dive in to these results, remember how much less expensive the Lenovo ThinkPad X1 Yoga Gen 8 was compared to the Apple MacBook Pro (2023)—and it still delivered better performance.

### Benchmark scores

CrossMark uses models of real-world applications to measure responsiveness and performance, so higher overall scores here provide insight into how a system might perform day-to-day tasks.

Regardless of job titles and descriptions, most laptop users surf the web and access web-based applications every day. Because WebXPRT is a browser benchmark, higher scores here could indicate a superior online experience.

#### Crossmark

Overall score | Higher is better

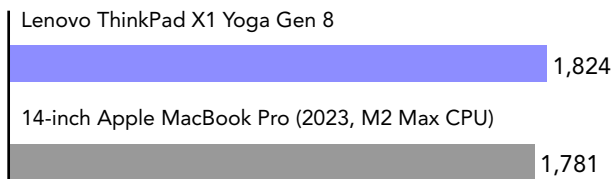


Figure 2: CrossMark overall scores. Higher is better. Source: Principled Technologies.

#### WebXPRT 4

Overall score | Higher is better

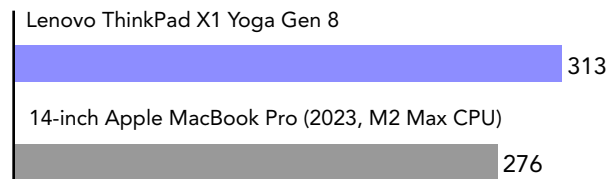


Figure 3: WebXPRT 4 with Chrome overall scores. Higher is better. Source: Principled Technologies.

Higher Cinebench R23 single-core scores highlight systems that have the power to better handle resource-intensive tasks such as computer-aided design (CAD) programs, complex spreadsheets, and scientific simulations. To determine system performance under a sustained load, we also ran the default Cinebench R23 10-minute workload five times back-to-back. And, while the two laptops performed comparably under load, it's worth noting that any score over 1,000 here is good enough for decent gaming performance.<sup>17</sup>

#### Cinebench R23 single-core

Overall score | Higher is better

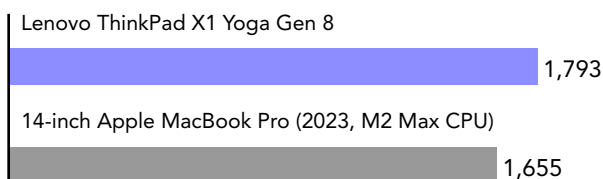


Figure 4: Cinebench R23 single-core scores. Higher is better. Source: Principled Technologies.

#### Cinebench R23 sustained single-core

Overall score | Higher is better

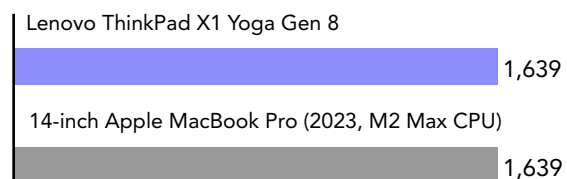


Figure 5: Cinebench R23 sustained single-core scores. Higher is better. Source: Principled Technologies.



Filling a swimming pool takes less time when you use a fire hose instead of a garden hose. It's the same with bandwidth, which is measured in megabits per second (Mbps). The more data a laptop transfers per second, the smoother the web browsing experience.

### Speedtest by Ookla

Speed scores (Mbps) | Higher is better

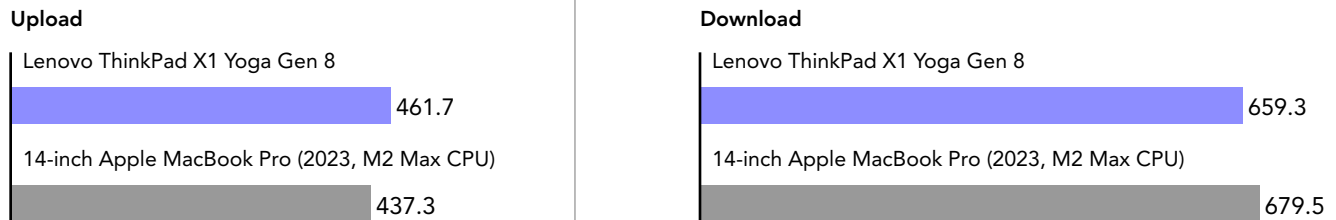


Figure 6: Speedtest by Ookla upload and download speed scores on Chrome. Higher is better. Source: Principled Technologies.

### About Intel Unison

Intel Unison enables users to sync their Evo-certified laptops with Android- or iOS-based phones. With Intel Unison, users can take photos and videos on their phones and transfer them to their laptops for storage and editing. Users have access to their phone's full contact list and can receive and manage phone notifications on their laptop screen. They can also use their laptop mouse or keyboard to receive or initiate voice calls and text messages.<sup>18</sup>

We tested this feature and found the ThinkPad X1 Yoga Gen 8, which is a non-macOS device, paired successfully with an iPhone®. We were also able to easily share iPhone files to the ThinkPad and access those files.

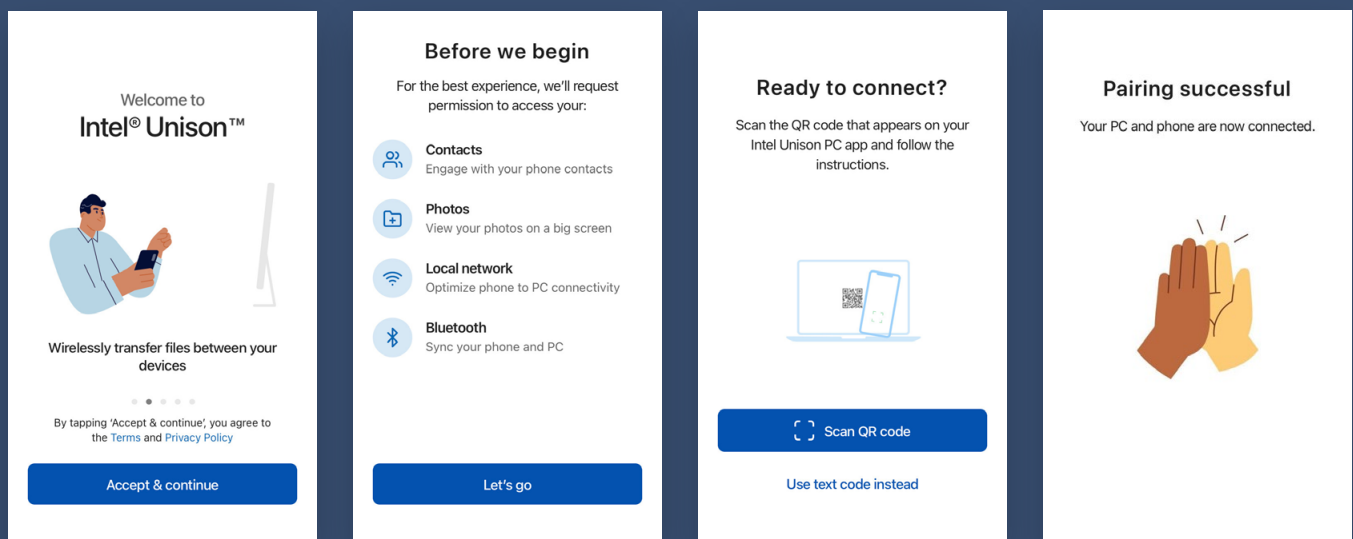


Figure 11: Screenshots of successful pairing of an Apple iPhone and a Lenovo ThinkPad X1 Yoga Gen 8 using Intel Unison. Source: Principled Technologies.

## Hand-timed Microsoft 365 tasks

For this comparison, we completed common Microsoft 365 tasks of the type many office users tackle daily. The Lenovo ThinkPad X1 Yoga Gen 8 finished the tasks faster than the Apple MacBook Pro—and while differences in seconds and fractions of seconds may seem small, these tiny speed bumps can make for a substantial difference in experience. When you factor in the number of times users toggle between applications during a single day and calculate the number of micro-annoyances over a week or a month, you can start to appreciate how the faster system really has the potential to both improve your mood and your productivity.

### Time to complete tasks in Microsoft 365

Seconds | Less time is better

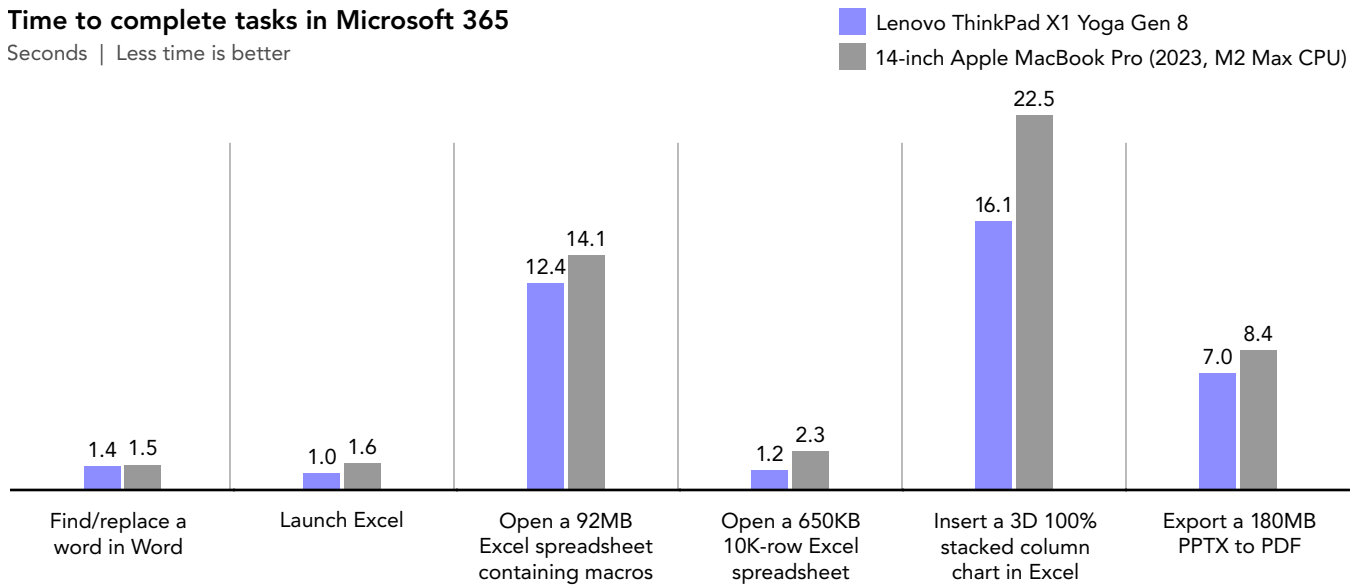


Figure 7: Time to perform various tasks in Microsoft 365. Less time is better. Source: Principled Technologies.

## Zoom video conferencing results

### CPU usage

For this comparison, we evaluated CPU usage in one-on-one and group meetings using Zoom on the Lenovo ThinkPad X1 Carbon Gen 11 and 14-inch Apple MacBook Pro (2023). For this test, we configured Zoom to enter full-screen automatically when starting or joining a meeting, chose the audio and video on options when joining a meeting, and chose side-by-side mode when screen-sharing. This last choice was to ensure the cameras were always on-screen along with the screenshare. For repeatable audio measurements, we played a YouTube video on the host device. Lower Zoom CPU usage matters because many people ask their computers to multitask during meetings. Multitasking examples include using virtual backgrounds and filters, delivering interactive presentations that include polls and word clouds, and running large events with multiple breakout rooms.

### System maximum CPU utilization while using Zoom

Percent utilization | Lower is better

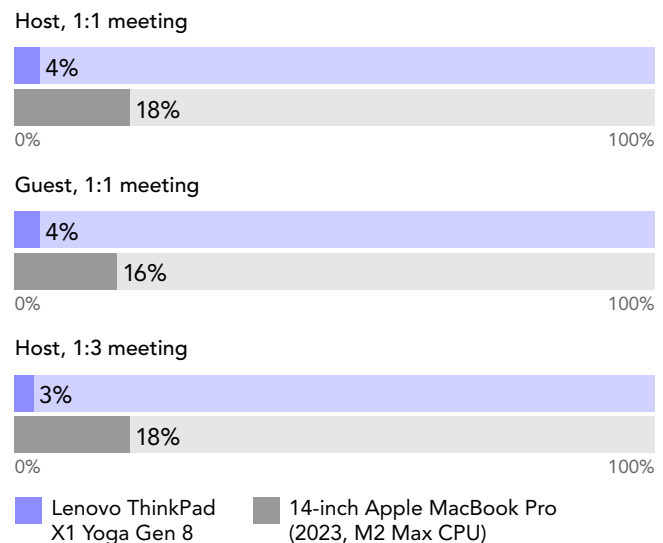


Figure 8: Zoom CPU usage, as reported by Zoom. Lower usage is better. Source: Principled Technologies.



## Audio experience results

With many companies embracing remote and hybrid work environments, the audio and visual components we use to keep connected with distant team members and clients are more important than ever.

### Microphone noise reduction

We found that the Lenovo ThinkPad X1 Yoga Gen 8, with its quad-microphone array with integrated AI-based noise cancellation and Dolby Voice®, was better at reducing background noise than the 14-inch MacBook Pro (2023), with its three-mic array, high signal-to-noise ratio, and directional beamforming.<sup>19,20</sup> With better background noise reduction and fewer audio distractions, it's easier for teammates and clients to hear you, focus on the subject at hand, and be part of the conversation.

### Speaker volume output

We found that the Lenovo ThinkPad X1 Yoga Gen 8, with its four speakers and Dolby® Atmos® surround sound technology, delivered louder speaker output than the 14-inch MacBook Pro (2023) with its high-fidelity six-speaker sound system.<sup>21,22</sup> For reference, 60 dB is the volume of normal conversation.<sup>23</sup> To simulate the variances in human modulation, we set the target dB to 64. While speaker volume output may not be a feature you prioritize, think about how frustrating a too-quiet speaker might be when you want to step away from your laptop to refill your coffee or grab a snack during a long video conferencing meeting you're not actively participating in. The louder the volume output, the further you can stray from your laptop.

### Background fan volume

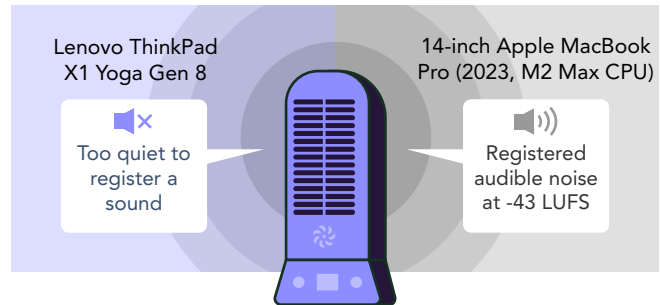


Figure 9: Microphone test background fan volume results. Lower LUFS, which are a standard loudness measurement, are better. Source: Principled Technologies.

### Maximum audio output needed to reach target dB

Percent of maximum system volume | Lower is better

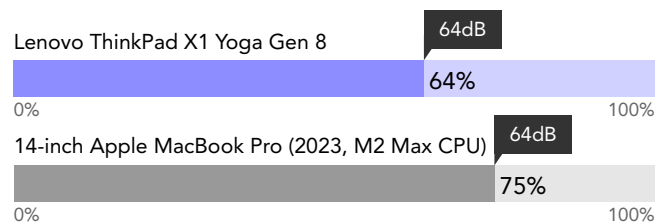


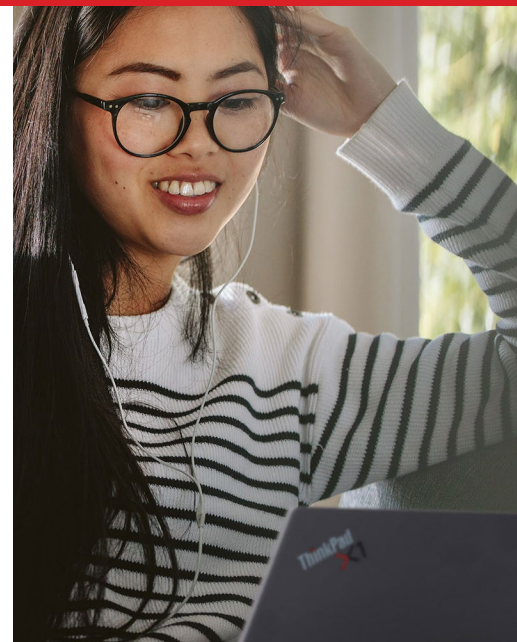
Figure 10: Speaker volume output level results. Lower is better. Source: Principled Technologies.

## Security from supply chain trust through end of life

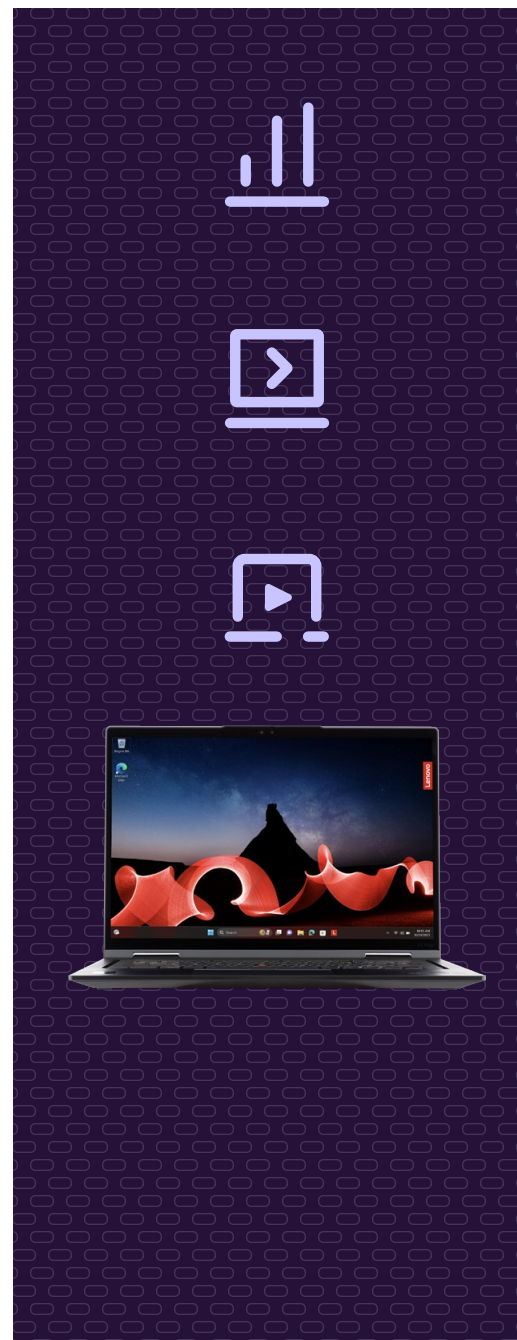
According to Help Net Security, supply chain attacks in 2022 caused more data compromises than malware—and impacted more than 10 million people.<sup>24</sup> Lenovo and Intel have partnered to provide deeper and broader protections from the point of manufacture through transport and until the end user has the device in their hands. The first step in this secure supply chain is Intel Trusted Device Setup and Intel Transparent Supply Chain. These services fall under the Lenovo ThinkShield umbrella, which, in addition to the device protection services we mention above, provides end-to-end protection of sensitive data with secure hardware, software, and services. With Lenovo ThinkShield and the Intel vPro platform, companies can fortify their business and protect their assets from manufacturing floor to final disposal.<sup>25</sup>

## Conclusion

The versatile Lenovo ThinkPad X1 Yoga Gen 8 delivered on price and performance, coming in at \$1,360.00 less expensive than the 14-inch Apple MacBook Pro (2023) when we ordered devices for this comparison. The Lenovo ThinkPad X1 Yoga Gen 8 also received higher scores (aside from an almost equivalent Ookla download score) on performance benchmarks, completed Microsoft 365 tasks in less time, provided solid mic noise reduction, enabled louder speaker volume, and consumed considerably fewer CPU resources during Zoom meetings than the 14-inch Apple MacBook Pro (2023). The ThinkPad X1 Yoga Gen 8 is a high-performing option for business users who want the most bang for their buck.



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