



**Up to 70% better performance for heavy workloads**

based on Cinebench R23 multi-core scores



**Up to 26% better performance for office productivity tasks**

based on Procyon Office Productivity overall rating



**Speed up tasks in Excel by up to 27%**

based on time to insert a 3D 100% stacked column chart in Excel

## Lenovo ThinkCentre M90q Gen 4 Tiny: Expect big things from small packages

The ThinkCentre M90q Gen 4 Tiny outperformed the Apple Mac mini (2023) with an M2 Pro processor on a number of industry-standard benchmarks and hand-timed tasks

Desktop system buyers now have multiple options, including small-form computers that provide the performance that users need for modern apps without taking up excess physical space.

At Principled Technologies, we used benchmarks and hand-timed workflows to assess the performance of two such compact computing options:

- **Lenovo® ThinkCentre® M90q Gen 4 Tiny** with a 13<sup>th</sup> Generation Intel® Core® i7-13700 processor
- **Apple® Mac® mini** (2023) with an M2 Pro processor

On a wide range of industry-standard benchmarks, the Lenovo ThinkCentre M90q Gen 4 Tiny outperformed the Apple Mac mini (2023)—including delivering up to a 70 percent higher score on Cinebench R23, which stresses the capabilities of the CPU and GPU. When we completed a series of common tasks in Microsoft 365, we found that the ThinkCentre M90q Gen 4 Tiny was more responsive, speeding up tasks in Excel by up to 27 percent.

With stronger performance on a wide range of common work, the Lenovo ThinkCentre M90q Gen 4 Tiny can easily fit into your business's plans—both physically and in performance and productivity goals for your team.

## About the Lenovo ThinkCentre M90q Gen 4 Tiny

The Lenovo ThinkCentre M90q Gen 4 Tiny features the Intel Core i7-13700 processor, two 16GB DDR5 SO-DIMM memory slots (dual-channel capable), and up to 1TB NVMe™ SSD storage. According to Lenovo, this tiny desktop offers flexible mounting options to fit into any space, supports as many as four displays, has built-in end-to-end security, including self-healing BIOS, and a toolless chassis design that makes it easy to upgrade & maintain.<sup>1</sup> To learn more about the ThinkCentre M90q Gen 4 Tiny, visit [https://www.lenovo.com/au/en/p/desktops/thinkcentre/m-series-tiny/thinkcentre-m90q-gen-4-tiny-\(intel\)/len102c0037](https://www.lenovo.com/au/en/p/desktops/thinkcentre/m-series-tiny/thinkcentre-m90q-gen-4-tiny-(intel)/len102c0037).



### Lenovo ThinkCentre M90q Gen 4 Tiny vs. Apple Mac mini (2023) with an M2 Pro processor

#### Connects with Android or iOS phones

Intel Unison™ connects PCs to Android and/or iOS phones<sup>2</sup>  
*Apple Continuity connects only macOS devices to iOS phones<sup>3</sup>*

#### Smaller footprint

7.05 x 7.2 x 1.44 inches with rubber feet  
*vs. 7.70 x 7.70 x 1.40 inches*

#### More efficient, stable connection with less interference

Bluetooth® 5.3  
*vs. Bluetooth 5.0<sup>4</sup>*

#### More business-focused connections

6x USB -A ports  
1x USB-C® port  
1x HDMI® port  
1x DisplayPort™  
1x VGA port  
1x Gigabit Ethernet port  
1x Kensington Security slot  
1x headphone/microphone jack

vs.

2x USB 3 ports  
2x Thunderbolt™ 4 ports  
1x HDMI  
1x headphone jack

## About the Intel Core i7-13700 processor

One of the 13<sup>th</sup> Generation Intel Core i7 processors, the i7-13700 offers up to 30MB Cache with clock speeds of up to 5.2 GHz. With 16 cores (eight performance cores and eight efficient cores) and up to 24 threads, the Intel Core i7-13700 processor meets the requirements of Intel vPro® Enterprise, Intel vPro Essentials, and Intel vPro Platform branding, which means it offers "the full set of security, manageability, and stability features for any given Intel processor generation, including Intel® Active Management Technology."<sup>5</sup>

## How we tested

Before we started our hands-on evaluation, we set the Windows power mode on the Lenovo Centre M90q Gen 4 Tiny to “Best performance.” Because the Apple Mac mini has no such setting, we left it as-is. Other than making and verifying that single change, we used out-of-box OEM performance settings for both systems:

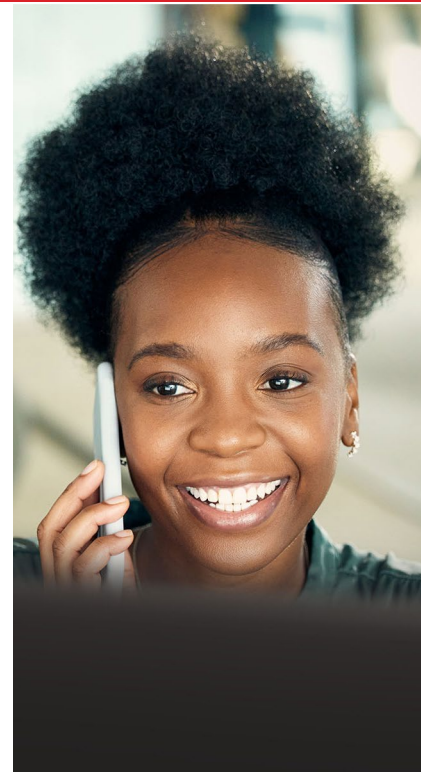
- **Lenovo ThinkCentre M90q Gen 4 Tiny** running Windows 11 Pro, powered by a 13<sup>th</sup> Generation Intel Core i7-13700 processor (2.1 – 5.2 GHz), 16 cores, Intel UHD graphics 770, 32 GB of memory, and 1 TB of SSD storage
- **Apple Mac mini (2023)** running macOS Ventura, powered by an M2 Pro processor (3.4 GHz), 12 cores, M2 Pro 19-core GPU GPU, 32 GB of memory, and 1 TB of SSD storage

We ran the following benchmarks to measure performance on the two devices:

- **Cinebench R23** is a benchmark that evaluates CPU and GPU capabilities using Redshift, a Cinema 4D rendering engine, and reports system performance under a heavy load.
- **CrossMark™** is a benchmark that 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.
- **WebXPRT 4** is a browser benchmark that runs a series of tests that include HTML and JavaScript handling as well as online homework, photo manipulation, and face detection tasks.
- **Procyon Office Productivity Benchmark** measures performance with workloads that contain common tasks in Microsoft 365 applications.
- **Geekbench 6** measures system performance using everyday tasks in popular applications. The benchmark provides a score for both the CPU and the GPU.

To get a better understanding of the systems and their application responsiveness, we hand-timed a series of common tasks in Microsoft Word, PowerPoint, and Excel.

All 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 systems and our testing parameters and procedures, see [the science behind the report](#).







### ThinkCentre M90q Gen 4 Tiny sustainability

Many consumers are conscious of the effect their purchases have on the environment. In fact, studies show that consumers are willing to pay more for technology products that use sustainable packaging.<sup>6</sup> To work toward their stated goal of net-zero emissions by 2050, Lenovo ships many systems in recycled or biodegradable packaging materials.<sup>7</sup> With environmental concerns in mind, the Lenovo ThinkCentre M90q Gen 4 Tiny offers:

- ENERGY STAR® certification
- EPEAT® Gold certification
- TCO 9.0 certification and available CO2 Offset Service
- Sustainable packaging, including:
  - EPE cushioning, an environmentally safe, recyclable foaming material
  - System bags made with 30% ocean-bound plastic (OBP)
  - Forest Stewardship Council (FSC) certified paper packaging materials, which saves trees
  - Packaging made with 65% post-consumer content

## Performance comparison: Benchmarks and system responsiveness

To compare system responsiveness and general performance, we used several industry-standard benchmarks that stress the systems in different ways. Looking at performance for a wide range of tasks can indicate the kind of performance you might expect on the tasks you complete day in and day out.

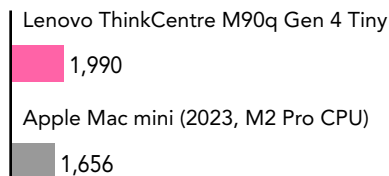
### Cinebench R23

Whether your employees use their systems for demanding tasks or not, looking at benchmarks like Cinebench R23, which stresses the GPU and CPU of the systems to show performance under heavy load, can indicate how devices might perform on a range of tasks. A higher Cinebench R23 score indicates that a system can better handle multi-threaded tasks, such as 3D rendering, video editing, and gaming.

#### Cinebench R23

Overall scores | Higher is better

##### Single-core



##### Multi-core

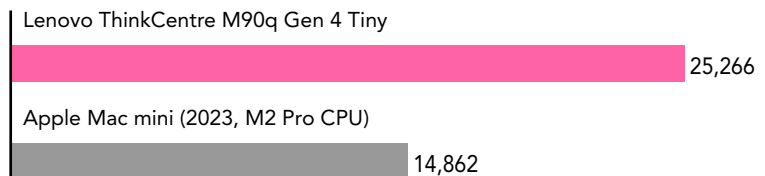


Figure 1: Cinebench R23 scores. Higher is better. Source: Principled Technologies.

## WebXPRT 4 with Chrome web browser

Workers everywhere browse the web or access web-based applications, so a better browser performance can make a big difference in daily productivity. The WebXPRT 4 benchmark compares browser performance, and a higher WebXPRT score indicates that a system can provide a better, more responsive web-browsing experience.

### WebXPRT 4

Overall scores | Higher is better

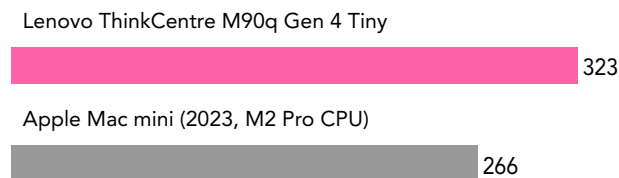


Figure 2: WebXPRT 4 overall scores. Higher is better. Source: Principled Technologies.

## CrossMark

Another benchmark that measures general system responsiveness, the CrossMark benchmark uses models of real-world applications in its tests. A higher CrossMark overall rating indicates better general system responsiveness.

### CrossMark

Overall scores | Higher is better

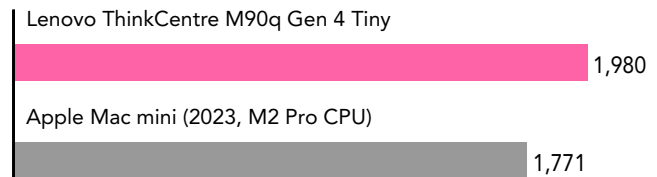


Figure 3: CrossMark overall scores. Higher is better. Source: Principled Technologies.

## 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>8</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>9</sup>



## Procyon Office Productivity Benchmark

Everyday office tasks make up a large part of many workers' days. The Procyon Office Productivity Benchmark measures performance while completing office productivity tasks such as creating or editing documents, spreadsheets, and slide presentations. A higher Procyon Office Productivity Benchmark score indicates that the system can provide better performance while using these Microsoft 365 applications.

### Procyon Office Productivity Benchmark

Overall scores | Higher is better

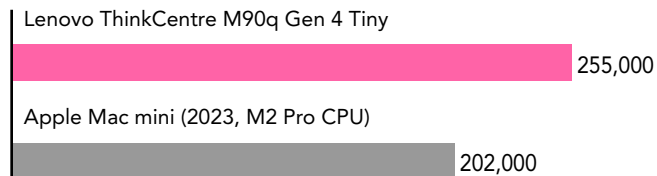


Figure 4: Procyon Office Productivity scores. Higher is better. Source: Principled Technologies.

### Connect with ease via Intel Unison

The Lenovo ThinkCentre M90q Gen 4 Tiny offers Intel Unison, which helps users transition from desktop to phone to aid multitasking. According to Intel, "Unison seamlessly connects your PC and devices for a universal, easy-to use experience."<sup>8</sup> Unison gives users the flexibility to make calls, send and receive text messages, transfer files, and manage notifications from their PC or their phone. To learn more about the features of Intel Unison, visit <https://www.intel.com/content/www/us/en/products/docs/unison/overview.html>.

The Intel® Unison™ solution is currently available for approved configurations of Windows-based PCs and pairs with Android or iOS-based phones or tablets. Intel Unison also requires a companion mobile app that can be downloaded from the relevant app store and all devices must run a supported OS version. Results may vary.

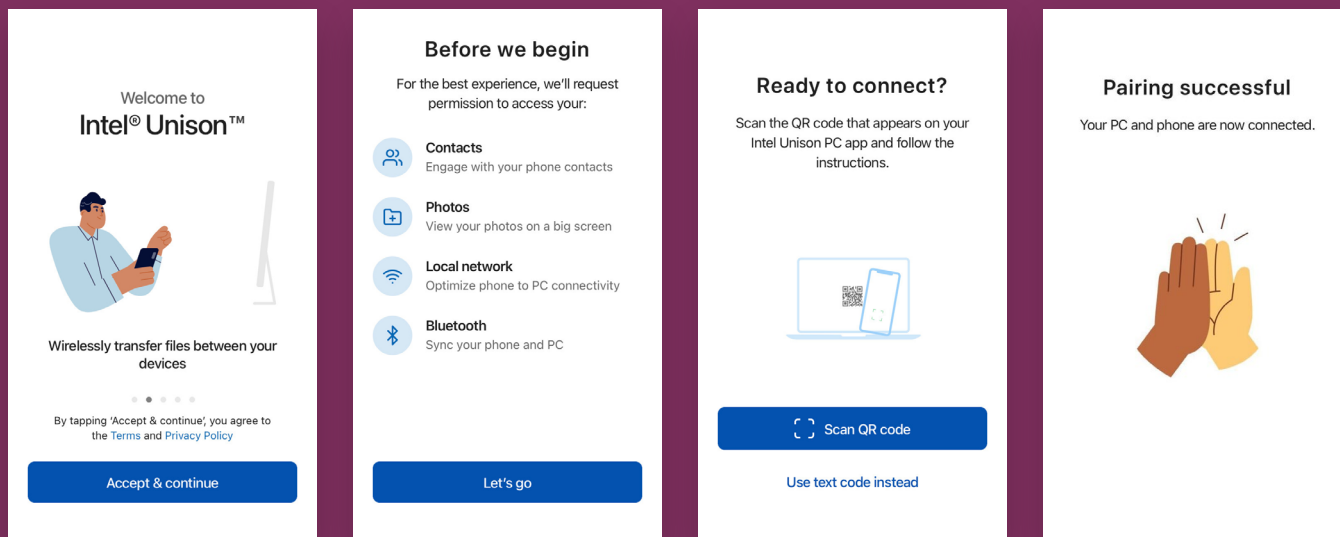


Figure 5: Screenshots of successful pairing of an Apple iPhone and a Lenovo ThinkCentre M90q Gen 4 Tiny using Intel Unison. Source: Principled Technologies.

## Geekbench 6

Geekbench 6 uses everyday tasks such as checking email or playing music to assess system performance. Higher single-core scores indicate improvements in tasks such as web browsing and office productivity applications. Higher multi-core scores indicate better performance for tasks like data analysis, video editing, and 3D gaming.

### Geekbench 6

Overall scores | Higher is better

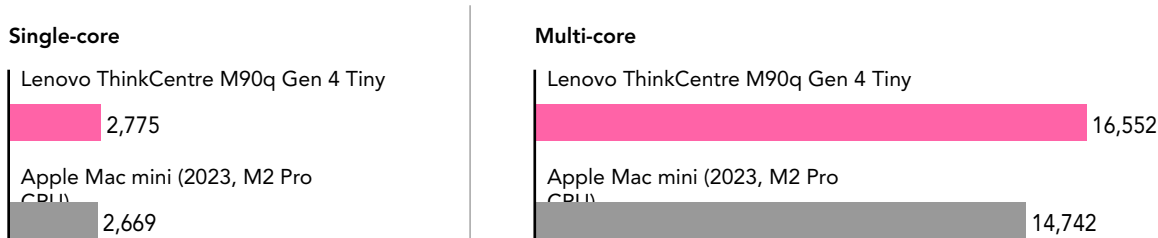


Figure 6: Geekbench 6 overall scores. Higher is better. Source: Principled Technologies.

## Measuring app responsiveness in Microsoft 365

Workers of all stripes access Microsoft 365 applications to complete some of their daily tasks. Simply launching these apps and completing basic functions in them take time, and the faster these tasks complete, the quicker workers can get down to business. These tasks may take only a few seconds, but over weeks and months, the seconds can add up. We hand-timed how long it took both systems to complete common tasks in Microsoft 365 and found that the ThinkCentre M90q Gen 4 Tiny completed the tasks in as much as 27.6 percent less time than the Mac mini (2023).

### Time to complete tasks in Microsoft 365

Seconds | Less time is better

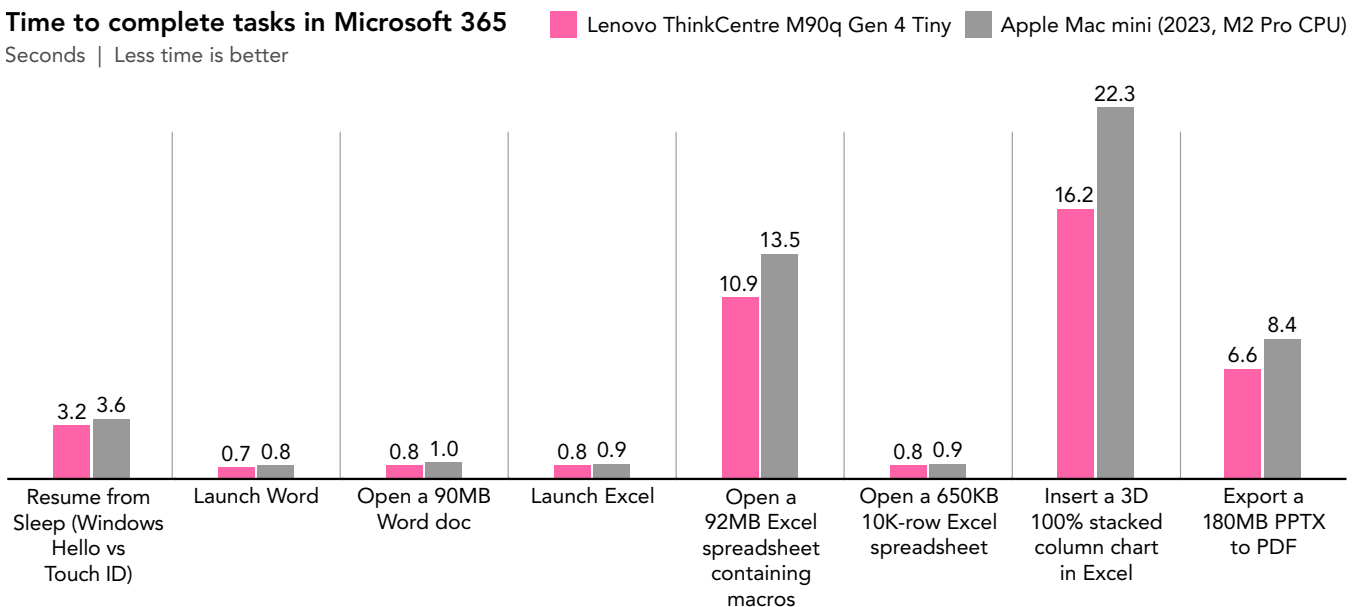


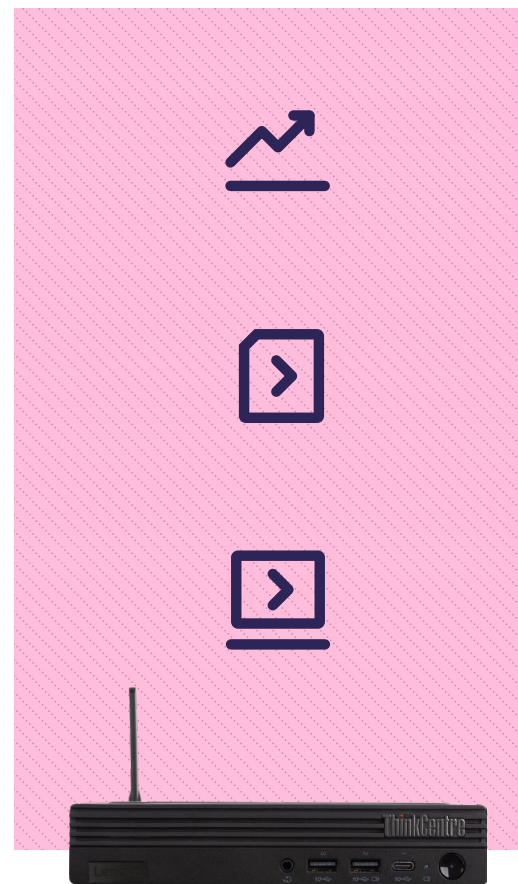
Figure 7: Time to perform various tasks in Microsoft 365. Less time is better. Source: Principled Technologies.



## Conclusion

If your organization needs powerful computing performance in a smaller footprint, compact desktops may be for you. In our series of benchmark tests, we found that one such compact desktop, the Lenovo ThinkCentre M90q Gen 4 Tiny, outperformed the Apple Mac mini (2023) with M2 Pro processor on everything from office productivity tasks to graphics rendering. Plus, the ThinkCentre M90q Gen 4 Tiny was more responsive on everyday tasks in Microsoft 365. With stronger performance in a smaller footprint alongside the benefits that Intel Unison, Intel vPro, and Lenovo ThinkShield can provide, the Lenovo ThinkCentre M90q Gen 4 Tiny may fit right into your business plans.

1. Lenovo, "ThinkCentre M90q Gen 4 Tiny," accessed November 15, [https://www.lenovo.com/au/en/p/desktops/thinkcentre/m-series-tiny/thinkcentre-m90q-gen-4-tiny-\(intel\)/len102c0037](https://www.lenovo.com/au/en/p/desktops/thinkcentre/m-series-tiny/thinkcentre-m90q-gen-4-tiny-(intel)/len102c0037).
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3. Make Use Of, "13 Ways to Use Your Mac and iPhone Together With Apple's Continuity," accessed September 27, 2023, <https://www.makeuseof.com/tag/mac-iphone-together/>.
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8. Help Net Security, "Supply chain attacks caused more data compromises than malware," accessed November 10, 2023, <https://www.helpnetsecurity.com/2023/01/26/data-compromises-2022/>.
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Read the science behind this report at <https://facts.pt/hM49aTu> ▶



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